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**ACUTE AND TWO-WEEK  
INHALATION TOXICITY STUDIES IN RATS  
FOR POLYALPHAOLEFIN (PAO) FLUID**

**David R. Mattie**

Bioeffects Division  
Molecular Bioeffects Branch

**Matthew D. Wegner**

Armed Forces Research Institute of Medical Sciences  
Bangkok, Thailand

**Brian A. Wong**

**R. Arden James**

Henry M. Jackson Foundation for the Advancement of Military Medicine  
Naval Medical Research Unit Dayton  
Wright-Patterson AFB OH

**Karen L. Mumy**

**Shawn M. McInturf**

Naval Medical Research Unit Dayton  
Wright-Patterson AFB OH

**Barry J. Marcel**

USAF School of Aerospace Medicine  
Consultative Services Division  
Wright-Patterson AFB OH

**Teresa R. Sterner**

Henry M. Jackson Foundation for the Advancement of Military Medicine  
Molecular Bioeffects Branch  
Wright-Patterson AFB OH

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**Air Force Research Laboratory  
711<sup>th</sup> Human Performance Wing  
Airman Systems Directorate  
Bioeffects Division  
Molecular Bioeffects Branch  
Wright-Patterson AFB OH 45433-5707**

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Acute and Two-Week Inhalation Toxicity Studies in Rats for Polyalphaolefin (PAO) Fluid

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DAVID R. MATTIE  
Work Unit Manager  
Molecular Bioeffects Branch

**MILLER.STEPHAN**  
**IE.A.1230536283**  
Digitally signed by  
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STEPHANIE A. MILLER, DR-IV, DAF  
Chief, Bioeffects Division  
Airman Systems Directorate  
711th Human Performance Wing  
Air Force Research Laboratory

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## PREFACE

Support for the research described herein was provided through the Aerospace Toxicology Program in the Air Force Research Laboratory, 711th Human Performance Wing, Airman Systems Directorate, Bioeffects Division, Molecular Bioeffects Branch (711 HPW/RHDJ) at Wright-Patterson Air Force Base (AFB) OH.

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The acute study without recovery was designed to be in compliance with the U.S. Environmental Protection Agency (EPA) guideline 870.1300, Acute Inhalation Toxicity (U.S. EPA, 1998a) and the Organisation for Economic Cooperation and Development (OECD) guideline, Test No. 403: Acute Inhalation Toxicity (OECD, 2009). The two-week study was designed to comply with OECD guideline, Test No. 412: Repeated Dose Inhalation Toxicity: 28-day or 14-day Study (OECD, 1981). The neurotoxicity assays in this study follow U.S. EPA 870.6200 Neurotoxicity Screening Battery (U.S. EPA, 1998b).

This study was not performed in a Good Laboratory Practice (GLP) Standards certified laboratory, and therefore there is no certification of compliance with GLP regulations (40 CFR Part 792). However, this study was conducted with an effort to follow the intent and purpose of GLP requirements.

The protocol “Toxicity Studies in Rats (*Rattus norvegicus*) and in the Mouse (*Mus musculus*) for Polyalphaolefin (PAO) Fluid” was approved by the Wright-Patterson AFB Installation Animal Care and Use Committee (IACUC) as protocol number F-WA-2014-0154. The study was conducted in a facility accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC), International, in accordance with the Guide for the Care and Use of Laboratory Animals (NRC, 2011). The study was performed in compliance with DODI 3216.1.

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## 1.0 SUMMARY

Formal occupational exposure limits (OELs) for polyalphaolefin (PAO) fluids have not yet been proposed. These fluids can be used as aircraft hydraulic fluid components and can be major constituents of heat sink coolant fluids for aircraft service air systems and electronics. These studies compared toxicity of a PAO fluid formulation (80 percent or greater hydrogenated 1-decene dimer with a proprietary additive package) in male and female Fischer 344 rats by acute inhalation (aerosol exposures at 0, 100, 500 and 1000 mg/m<sup>3</sup> for six hours) and two-week inhalation (0, 20, 100 and 300 mg/m<sup>3</sup> for six hours per day, five days per week for two weeks). Food, water and body weights were monitored for all animals. Functional observational battery (FOB) and motor activity assessments were conducted in the animals following the six-hour acute exposure and two weeks after exposure in a recovery cohort. In the two-week study, FOB and motor activity measurements were conducted following the ninth and tenth six-hour exposure, respectively. Blood was collected during necropsy for clinical chemistry and hematology. Tissues were collected for histopathology following exposures and recovery: nasal airways (four levels), trachea, larynx, lungs (three levels), liver (two levels), both kidneys, spleen, both adrenal glands, brain and heart.

Particle size distribution measurements of the exposure atmosphere showed that the PAO aerosol was respirable for both the acute and two-week study. The overall average measured concentrations in both studies were within 2 percent of the target concentrations.

Immediately following the acute exposure, neurobehavioral tests showed that both male and female rats appeared to be more passive after exposure to high concentration PAO, and to a lesser extent after the intermediate concentration PAO. The FOB handling test, as well as the motor activity total distance traveled and ambulatory beam breaks measurements, provided evidence of increased passivity. Body weight, food and water consumption were affected immediately post exposure, then recovered 24 hours later. Clinical chemistry and hematology results did not show any trends that could be related to a biological response due to inhalation of PAO. Histopathology results from the acute cohort immediately following exposure indicated a dose response increase in severity (minimal to mild) of lesions in the posterior nasal cavities and lungs. Severity of lesions was reduced in the 14-day recovery cohort, ranging from normal to minimal.

Following the two-week repeated exposure study, no effects were seen for neurobehavioral endpoints, body weight, or food and water consumption. Clinical chemistry and hematology results did not indicate a biological response due to inhalation of PAO. Histopathology for the two-week exposure showed lesions only in the posterior nasal cavities and lungs of the high exposure concentration group, with severity less than in the acute cohort intermediate and high concentration groups.

These results indicate that acute effects are short-lived and recoverable. Short-term repeated exposure does not result in any cumulative effects except for minimal respiratory tract changes in the 300 mg/m<sup>3</sup> group. Since shorter term operational exposure limits (OpELs) are needed to cover times that are more consistent with Air Force operations, Acute Exposure Guideline Level (AEGs) were proposed for interim use by the Air Force. Using the six-hour exposure for

concentration and time; the no observed adverse effect concentration for histopathological effects seen in the respiratory tract ( $100 \text{ mg/m}^3$ ); and uncertainty factors totaling 30, AEGL-1 values of 36, 36, 18, 4.5, and  $2.3 \text{ mg/m}^3$  were proposed for 10 and 30 minutes and one, four, and eight-hour exposures to this PAO formulation, respectively. These proposed values constitute only the first step of AEGL development. However, these preliminary OpELs should be protective for both inhalation effects and neurobehavioral changes from PAO aerosol exposures that could compromise the Air Force mission and the health of the warfighter.



## 2.0 INTRODUCTION

Formal occupational exposure limits (OELs) for polyalphaolefin (PAO) fluids have not been proposed. There are insufficient published literature studies to support proposing a DoD operational exposure limit (OpEL) from documented sources. An OpEL is simply defined as a data driven value calculated with the intent to protect the safety of warfighter/airmen when an OEL is unavailable.

PAO fluids are used as the chemical base stock in hydraulic fluids and are the primary component of heat sink coolants for aircraft service air systems and electronics. In the F-22, the engine service air, after being cooled in heat sink units containing commercial PAO formulations, is used by the on board oxygen generator system (OBOGS) to provide oxygen to the pilot at altitude (Martin *et al.*, 2012).

PAOs have become a potential contaminant of concern for the U.S. Air Force (USAF). The PAO originating from the heat sink units has been found as a contaminant throughout the F-22 oxygen system in both ground and flight tests. Further, F-22 pilots have experienced hypoxia-like incidences during flight. Those incidences have been investigated as potentially having a neurological origin. Without sufficient data on contaminants such as PAOs, neurotoxicity of these fluids is an ongoing concern for the USAF (Martin *et al.*, 2012).

F-18 Navy Hornets and Marine Growlers also use the OBOGS. These pilots have also experienced numerous unexplained hypoxia and/or breathing air contamination events (Freedberg, 2016; Myers, 2016). Therefore, there is cross-service interest in PAO toxicity information (Krohn, personal communication).

Studies designed to facilitate the estimation of human OpELs for PAO formulations are necessary to assure safety and operations performance during exposure of pilots and maintainers of high performance aircraft. Acute and short-term tests are required due to the acute, repeat exposures of pilots and maintainers; these exposures differ from the common continuous eight-hour exposure investigated for a factory occupational setting. Preliminary evidence suggested acute (one to four hours) exposure to a PAO fluid caused lung irritation in rats (John Hinz, personal communication).

The studies described herein take into consideration the unique exposures and concerns for the USAF pilot. The acute study without recovery is based on the U.S. Environmental Protection Agency (EPA) guideline 870.1300, Acute Inhalation Toxicity (USEPA, 1998a) and the Organisation for Economic Cooperation and Development (OECD) guideline, Test No. 403: Acute Inhalation Toxicity (OECD, 2009). The acute study with recovery is a modification of the study design used by Mattie *et al.* (2012) to better address the acute exposure to the hydroprocessed esters and fatty acids - mixed fats jet fuel. The two-week study design is based on OECD guideline, Test No. 412: Repeated Dose Inhalation Toxicity: 28-day or 14-day Study (OECD, 1981).

## 2.1 Objective

The objective of this project was to conduct two inhalation studies with a PAO fluid meeting the Military Specification MIL-PRF-87252C for use in aircraft heat sink coolant systems. Data generated were utilized to propose an exposure limit for DoD use. To that end, an acute study was designed to investigate the inhalation toxicity of the PAO fluid by inhalation exposure at three concentrations plus a zero clean air control level (0, 100, 500, and 1000 mg/m<sup>3</sup>) to Fischer 344 rats (10 rats per sex per exposure group) for a single six-hour exposure. Endpoints included neurobehavioral testing, gross pathology, clinical chemistry, hematology, and histopathology. A second set of 80 animals was exposed at the same concentrations and then allowed recovery for two weeks prior to measurement of the same endpoints in order to permit evaluation of effects that may have persisted beyond the immediate exposure.

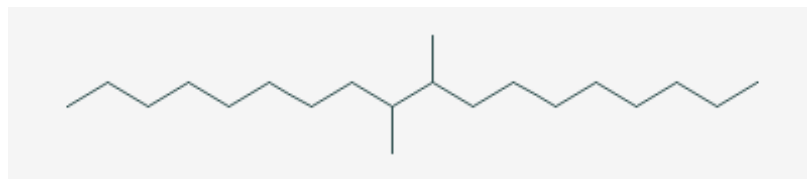
Results from the acute study were utilized to set exposure concentrations for the two-week study (six hours per day, ten exposures). Fischer 344 rats (10 rats per sex per exposure group) were exposed to 0, 20, 100, and 300 mg/m<sup>3</sup> PAO fluid aerosol. Neurobehavioral testing was performed immediately following the ninth and tenth exposure, and necropsy, including general pathology, clinical chemistry, hematology, and histopathology, occurred the following day.

## 3.0 METHODS

General methods that pertain to both studies are detailed in Sections 3.1 through 3.5. Specific methods for the acute and two-week studies are found in Sections 3.6 and 3.7, respectively. Method related excerpts from the approved animal use protocol can be found in Appendix A.

### 3.1 Chemical

PAO fluids utilized in the environmental control systems of aircraft to cool the air for the OBOGs consist primarily of hydrogenated 1-decene dimers (Figure 1). Chemical properties are listed in Table 1. The PAO formulation used was supplied by Radco Industries, Inc. (Batavia IL). The safety data sheet for this product can be found in Appendix B. This product contains 0.5 to 20 percent proprietary additive package. Use of a commercial name and product does not constitute endorsement of the product by the U.S. Air Force, U.S. Navy, or U.S. Army. This PAO formulation is currently in use aboard the F-22 and is believed to be representative of PAO coolants in this class that also meet MIL-PRF-87252C(1) specifications.



**Figure 1. Hydrogenated 1-Decene Dimer.** Chemical structure of main chemical component in PAO fluids

Due to the volume requirements, different Radco batch numbers were used for inhalation exposures. During the acute study, exposures occurred on five different days (individual rats were exposed only once, see Section 3.6). For exposure system development and calibration and on days 1 through 3, lot number 09Z104 was used. Lot number 15Z125 was used on days 4 and 5, and for the two-week study. There was no apparent difference regarding the handling of the material, nor how it behaved during the exposure atmosphere generation process. The batches were considered to be identical for the purpose of toxicological evaluation.

The PAO fluid was stored in a well ventilated area at room temperature. The material was used undiluted (neat).

**Table 1. Properties of the PAO Fluid from the Safety Data Sheet**

Product:	XCEL THERM® 500M Coolant Fluid
Formula:	N/A (mixture)
Major Components:	1-Decene dimers, hydrogenated (CAS# 686499-11-6): 80-99.5% Proprietary additive package: 0.5-20%
Molecular Weight:	N/A (mixture)
Description:	Colorless liquid
Test Substance Category:	Coolant
Storage:	Keep container closed tightly in cool, well-ventilated place Store at temperatures between 10 and 50 °C
Stability:	Chemically stable under normal conditions of handling and use
Supplier:	RADCO INDUSTRIES, INC

Notes: CAS: chemical abstract service, N/A: not applicable

### 3.2 Animals

Fischer 344 rats used in these studies were provided by Charles River Laboratories, International (Kingston NY). Rats were approximately five weeks old at receipt. All animals appeared to be in good condition at receipt. Animals were quarantined for two weeks, which also served as an acclimation period. During this period, animals were pair housed in solid bottom plastic cages. Following approval by the attending veterinarian, during quarantine, animals began exposure cage acclimation. Animals were loaded and unloaded daily for durations increasing in length from one to six hours in wire mesh exposure cages (R-24, Lab Products, Seaford DE) with water available *ad libitum*.

Animal room conditions were maintained at a target of 22°C and 50 percent humidity, with a 12-hour light/dark cycle. Animals were fed a certified rodent diet (Formulab Diet Purina Lab Chow, PMI Nutrition, International, LLC, Brentwood MO) and reverse osmosis purified municipal tap water, *ad libitum*.

Rats were randomly assigned to exposure groups following release from quarantine. Animals were weighed daily, at approximately the same time each morning, Monday through Friday. All animals were observed on multiple occasions daily and during each handling (weighing, loading, and unloading) and for neurobehavioral tests.

For both the acute and two-week study, the following procedure was followed in order to prevent exposure of control animals to the test product. Control animals were weighed, loaded into R-24 wire mesh exposure cages, and transported from the vivarium to the animal exposure room. Control animals were secured into the 1-m<sup>3</sup> exposure chamber (H1000, Lab Products, Seaford, DE) prior to handling the other animal groups. The remaining animals from the exposed groups were then weighed and transported. Food and water weights were recorded after all body weights were obtained and the animals were secured in the exposure chambers. Following the six-hour exposure, control animals were removed from the exposure chamber, placed in their home cages, and taken either for neurobehavioral testing or returned to the vivarium depending on the schedule (see Sections 3.7 and 3.8). Following the six-hour exposure and 30-minute chamber clearance and off-gas period, low, intermediate, and high exposure groups were placed in their home cages on racks and taken either for neurobehavioral testing or returned to the vivarium and housed in a separate room away from control animals. Animals were returned after neurobehavioral testing concluded and were held together on a separate rack within the control or exposed animal rooms.

### 3.3 Inhalation Exposure System

Rats in wire mesh exposure cages were exposed by inhalation in a glass and stainless steel whole-body exposure chamber (model H1000, Lab Products, Seaford DE) with a volume of 1-cubic meter (Figure 2). Four chambers were used, one for each exposure group. The inhalation chamber can hold up to three cage units; a single cage unit placed in the middle of the chamber was used to hold the animals in each exposure chamber for this study. The exposure chambers were operated at a total flow rate of approximately 225 L/min to provide at least one complete air change in 4.45 minutes (13.5 air changes/hour) giving a T<sub>99</sub> equilibrium time of approximately 20.5 minutes. T<sub>99</sub> is the time for the concentration of test substance in the chamber to rise from background or zero to 99 percent of the equilibrium or target concentration. Temperature and relative humidity inside the exposure chambers were maintained between 20 and 24° C (68 and 75° F) and between 30 and 70 percent, respectively. Food was not available during exposure, but reverse osmosis purified water was available *ad libitum*.

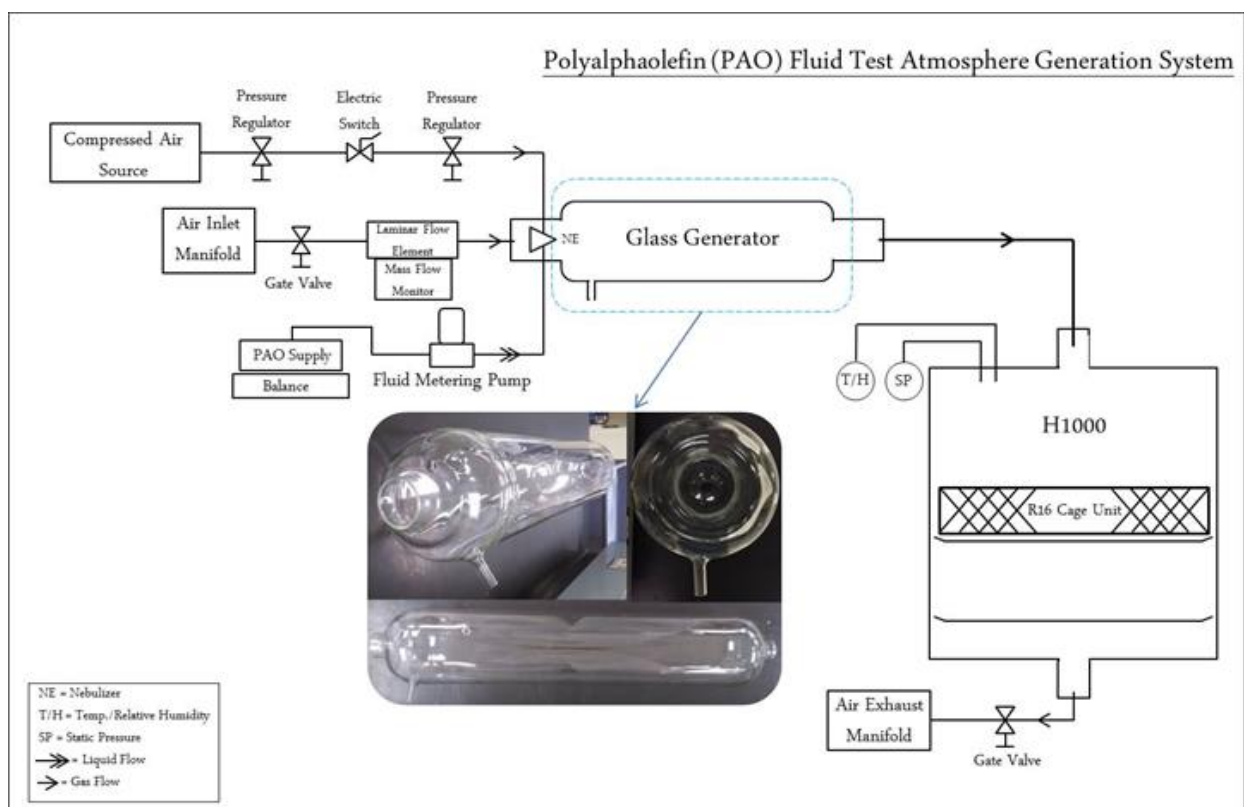
The inhalation chamber air supply was sourced from room air that passed through a 95 percent high efficiency particulate air (HEPA) filter. The test atmosphere was generated by pumping PAO fluid from a glass bottle reservoir into an air atomizing nozzle (Model SUJ1A with fluid cap 1650 and air cap 64, Spraying Systems Co., Wheaton IL) using a liquid metering pump

(Variable Speed Pump QV, Fluid Metering, Inc., Syosset NY). Compressed instrument air at approximately 52 to 55 psi was supplied to the nozzle. The air flow of the compressed instrument air was measured to be approximately 38 L/minute using a thermal mass flowmeter (Mass Flowmeter 4045, TSI Inc., Shoreview MN). The spray was directed into a custom designed glass mixing chamber placed in-line with the inlet air stream to the exposure chamber (Figure 3).

The exposure period started when the FMI pumps controlling the PAO fluid flow were activated. The concentration in the chamber began to increase immediately, as observed on a real-time aerosol monitor (Data RAM DR-4000, Thermo Scientific, Franklin MA). At the end of the exposure period the FMI pumps were shut off via a countdown timer (Traceable Countdown Controller 14-648-36, Fisher Scientific, Ottawa, Ontario) set for six hours. At that time, the chamber was operated at the same flow rate using clean air for at least 30 minutes so that the test material was cleared from the chamber before removing the animals.



**Figure 2. Whole Body Exposure Chamber**



**Figure 3. Diagrammatic Representation of the PAO Exposure System**

PAO fluid is non-volatile; the exposure atmosphere was in an aerosol form, with very little or no vapor. Concentrations in each of the four exposure chambers were measured using a 47 mm in-line gravimetric filter holder (In-Line Filter Holder, In-Tox Products, Moriarty NM). Concentration was determined by weighing the mass of test material collected per volume of air passing through the filter. The mass of the filters both pre- and post-exposure were measured on the same scale (AX205 DeltaRange, Mettler Toledo, Columbus OH). Concentration measurements were taken three times a day for an extended period of time ranging from 25 to 137 minutes. An optical aerosol monitor was used to observe the stability of the concentration inside each of the chambers. This real-time aerosol monitor (DataRAM4, Thermo Scientific, subsidiary of Thermo Fisher Scientific, Waltham MA) measured aerosol concentration continuously and recorded a reading approximately every two minutes, which provided a near-instantaneous reading of the aerosol concentration and allowed for adjustments as necessary.

Particle size measurements for the test atmosphere was taken once a day for the low, intermediate, and high exposure chambers. The particle size distribution was measured using a seven stage cascade impactor (7 Stage Cascade Impactor, In-Tox Products, Moriarty NM). The collection substrate used for each stage was a 37 mm polyester film (Mylar Film, Grafix Plastics, Cleveland OH). Pre- and post-exposure weights of the individual substrates were on the AX205 DeltaRange scale.

The uniformity of aerosol concentration was checked using the DataRam4. This real-time monitor was used to sample from 9 locations (center and 8 corner areas) in an exposure chamber after atmosphere generation had stabilized. Each position was sampled for approximately 8 to 10 minutes in a sequential manner. The center position was sampled 4 times within the sequence.

Temperature and relative humidity were measured by a temperature/relative humidity probe (Model HF532WB6XD1XX, Model HC2-S, Rotronics Instruments, Inc., Hauppauge NY) located inside each exposure chamber. The target temperature was between 20 and 24 °C (68 and 75 °F) and the target relative humidity was between 30 and 70 percent. Temperature and humidity were recorded every 15 minutes on the first exposure day and every 30 minutes on all subsequent exposure days.

The static pressure of each inhalation chamber was determined using both a pressure gauge (Magnahelec model 2304, Dwyer Instrument Co., Michigan City IN) with a large visual display and an electronic sensor (Model ZPS-05-SR09-EZ-ST-D, Building Automation Products, Inc., Gays Mills WI). The control chamber inlet and outlet air flows were operated with a slightly positive static pressure (approximately 0.05 inches of water) to prevent room air from entering the chamber. The low, intermediate and high exposure level chamber flows were set to a slightly negative static pressure (approximately -0.05 inches of water) to prevent the test chemical from entering the room air.

### **3.4 Neurobehavioral Assessment**

Neurobehavioral assessment is described in detail in the U.S. EPA Guideline 870.6200: Neurotoxicity Screening Battery (U.S. EPA, 1998b). The neurobehavioral assessment consisted of motor activity measurements and the functional observational battery as described below.

**3.4.1 Motor Activity.** Motor activity (gross locomotor movements and exploratory behavior) was evaluated by placing rats individually in clear plastic open fields measuring 16 x 16 x 15 inches (width x depth x height, respectively) with horizontal and vertical photobeam frames. The photobeam activity system (PAS) and software were purchased from SDI (San Diego CA). The photocells were mounted one-inch apart in frames placed at ground level to detect horizontal movement and in an elevated frame to detect vertical rears, as well as differentiate small (stereotypic) movements from large (ambulatory) movements.

Each individual animal was placed in the center of the open field and left uninterrupted for the duration of a 30-minute test session. Chamber recordings were initiated once all eight animals were loaded in their individual fields. Beam breaks were automatically recorded using a photobeam activity system and software from San Diego Instruments (San Diego CA). The following dependent measures were automatically recorded: distance traveled (cm), average speed (cm/sec), number of fine beam breaks (stereotypical), number of ambulatory beam breaks, total number of rears, percentage of time in center versus perimeter, and total activity habituation over six 5-minute blocks.

Motor activity was measured in a room with white noise generated at 73 dB to mask or equalize ambient room noise levels of approximately 70 dB. Low illuminating light was standardized at approximately 30 lux. Neither food nor water was provided during behavioral observations. Between each test, the open fields were washed with a solution of 10 percent ethanol to remove olfactory cues from the previous occupants. Exposure groups were distributed across the eight chambers as evenly as possible over the course of the study.

**3.4.2 Functional Observational Battery.** A functional observational battery (FOB) evaluates signs of toxicity to the nervous system that may result in gross behavioral changes and functional deficits (U.S. EPA, 1998b). The FOB consists of non-invasive procedures designed to evaluate and document the absence or presence (with severity, if appropriate) of a predetermined set of rat behavioral and clinical signs. Behavior/response observations are made 1) while the rat is in an observation cage, 2) during removal of the rat from the observation cage, 3) while the rat is being held and examined for clinical observations, 4) as the animal moves freely about the open field, and 5) during manipulative tests. Observations proceed from the least to most manipulative tests to reduce the influence of handling on behavior.

In the interest of time, a condensed FOB was chosen to include the following observations:

- In cage observations: Posture, tremors and spasms, and palpebral closure
- Observations during removal from cage and handling: Reactivity to handling, muscle tone, lacrimation, salivation, fur appearance, facial crust, breathing pattern, and other clinical signs
- Manipulative Observations:
  - Approach response: Response to a blunt object approaching and stopping in front of the animal's nose
  - Acoustic response: Response to a hidden metallic click
  - Tail pinch response: Response to a pinch of the tail
  - Visual placement: Response of forelimb to grasp for a surface while being held by the observer
  - Surface righting: Righting response to being turned and briefly held on its back
  - Grip strength: Force necessary to break the animal's grip on a wire mesh

Conditions (sound level, temperature, humidity, lighting, odor, time of day and environmental distractions) were controlled as closely as possible to minimize their impact on test outcomes. Rats were assigned a temporary identification number using cage cards in order to keep FOB observers blind to the treatment group. Neither food nor water was provided during behavioral observations conducted outside the home cage.

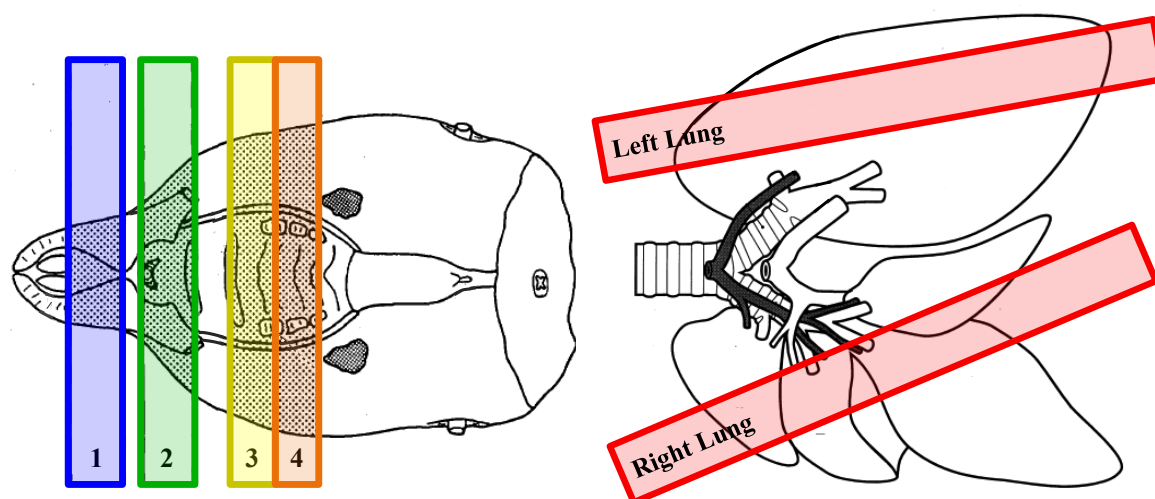
### **3.5 Necropsy, Clinical Chemistry and Hematology**

Prior to scheduled necropsy, the rats were fasted overnight. Water was available *ad libitum*. The rats were weighed, anesthetized, and euthanized in accordance with current American Veterinary Medical Association (AVMA) guidelines (AVMA, 2013).



Following gross necropsy, the rats were dissected and select tissues including the brain, heart, both kidneys, both adrenal glands, liver (2 levels), spleen, lungs (3 levels), larynx, and trachea were processed, embedded, cut, and mounted onto slides. The skull, saved for examination of the nasal tissues, and the slides were shipped to the pathology staff at 711 HPW/RHDV (Fort Sam Houston TX). There, the nasal cavities were sectioned according to Young (1981). Nasal cavity and lung sections are identified in Figure 4. All tissues from the acute and repeated exposure studies were read by a board certified pathologist.

Clinical chemistry and hematology parameters were measured in blood samples taken at the time of necropsy. Samples of whole blood with anticoagulant were analyzed using a blood analyzer (Hemavet 950, Drew Scientific, Dallas TX), while samples of plasma were analyzed using a chemistry analyzer (Vet Test 8008 and Vet Lyte, IDEXX Laboratories, Westbrook ME).



**Figure 4. Nasal Cavity and Lung Tissue Sections used for Histopathology.** Nasal cavity drawing (left) indicates nasal levels NL1 through NL4 (adapted from Young, 1981). Lung drawing (right) indicates sections taken from both right and left lungs (adapted from Nawata *et al.*, 1997).

### 3.6 Statistical Analysis

Statistical differences were assessed based on calculations between exposure groups, not replicates within exposure groups. Male and female differences were calculated as well as between exposure group differences. Sigma Plot software (Systat Software, Inc., San Jose CA) was used for in-life data such as body weight, body weight gain, and food and water consumption. Post-mortem data such as hematology and clinical chemistry were also evaluated. The probability value of less than 0.05 was used as the critical level of significance for each statistical test

Normality was tested using the Shapiro-Wilk test. Levene's test ( $p < 0.01$ ) was performed to check for equal variance. Data for quantitative, continuous variables were compared for the

exposure and control groups, independently for each gender, by one-way analysis of variance (ANOVA). If the ANOVA indicated statistical significance among experimental groups, the Dunnett's test was used to delineate which groups differ from the control group. The probability value of less than 0.05 was used as the critical level of significance for each statistical test.

When assumptions for parametric ANOVA were not met, Kruskal-Wallis or Wilcoxon Rank sum nonparametric procedures were used. Additional exposure group comparisons of various test session activities were also performed. Incidence data were compared using the appropriate statistical test, generally Chi-Square test. Incidence data for selected FOB endpoints with ordered severity scores were analyzed for group differences using appropriate measures of association.

**3.6.1 Neurobehavioral and Histopathological Statistical Analysis.** For neurobehavioral assessments, the data for quantitative, continuous variables were compared for the exposure and control groups by tests for homogeneity of variance, using one-way ANOVA. If the ANOVA indicated statistical significance among experimental groups, the Dunnett's test was used to delineate which groups differed from the control group. When assumptions for parametric ANOVA were not met, Kruskal-Wallis or Wilcoxon Rank-sum nonparametric procedures were used. Additional exposure group comparisons of various test session activities were also performed.

Neurobehavioral and histopathological incidence data were compared using the appropriate statistical test, generally Chi-Square test. Incidence data for selected FOB endpoints with ordered severity scores were analyzed for group differences using appropriate measures of association.

Statistical analyses were performed using Sigma Plot software. The probability value of less than 0.05 was used as the critical level of significance for each statistical test, except in the Chi-Square test, for which probability values of less than 0.001 and 0.01 were utilized.

### **3.7 Acute Inhalation Study Specific Methods**

Due to limitations on the numbers of animals that could be observed at the same time in the neurobehavioral tests, and to avoid having groups of animals with significantly different time intervals between the end of exposures and the neurobehavioral tests, the acute study was broken into five replicates. Each replicate consisted of 16 male and 16 female rats with 8 per sex for the acute cohort plus 8 per sex for the recovery cohort. Table 2 provides the breakdown of the replicates by necropsy group and exposure concentration and Table 3 shows the four-week testing schedule that was used for these replicates.

Neurobehavioral tests were conducted within two hours following the single six-hour exposure to PAO or following a 14-day recovery period. On each assessment day, one half of the males and females (4 of each sex) were put into monitoring boxes for motor activity measurements,

while the other half underwent FOB assessments. Following completion of the first test, the animals were switched to the other test.

**Table 2. Acute Study Replicates by Cohort with Animal Cage Numbers**

Replicate	Exposure Concentration	Acute Cohort (Animal Cage #)		Recovery Cohort (Animal Cage #)	
		Males	Females	Males	Females
R1	Control 0 mg/m <sup>3</sup>	1, 3	2, 4	5, 7	6, 8
R2		9, 11	10, 12	13, 15	14, 16
R3		17, 19	18, 20	21, 23	22, 24
R4		25, 27	26, 28	29, 31	30, 32
R5		33, 35	34, 36	37, 39	38, 40
R1	Low 100 mg/m <sup>3</sup>	41, 43	42, 44	45, 47	46, 48
R2		49, 51	50, 52	53, 55	54, 56
R3		57, 59	58, 60	61, 63	62, 64
R4		65, 67	66, 68	69, 71	70, 72
R5		73, 75	74, 76	77, 79	78, 80
R1	Intermediate 500 mg/m <sup>3</sup>	81, 83	82, 84	85, 87	86, 88
R2		89, 91	90, 92	93, 95	94, 96
R3		97, 99	98, 100	101, 103	102, 104
R4		105, 107	106, 108	109, 111	110, 112
R5		113, 115	114, 116	117, 119	118, 120
R1	High 1000 mg/m <sup>3</sup>	121, 123	122, 124	125, 127	126, 128
R2		129, 131	130, 132	133, 135	134, 136
R3		137, 139	138, 140	141, 143	142, 144
R4		145, 147	146, 148	149, 151	150, 152
R5		153, 155	154, 156	157, 159	158, 160
Total # of Animals		40	40	40	40

**Table 3. Acute Inhalation Study Staggered Exposure, Neurotoxicity Assays, and Necropsy Schedule**

	Monday	Tuesday		Wednesday		Thursday		Friday
Week 1		R1a,r (16)	R1a,r (16)	R2a,r (16)	R2a,r (16)	R3a,r (16)	R3a,r (16)	
		R1a (8)	R1a (8)	R2a (8)	R2a (8)	R3a (8)	R3a (8)	
				R1a (8)	R1a (8)	R2a (8)	R2a (8)	R3a (8)
Week 2				R4a,r (16)	R4a,r (16)	R5a,r (16)	R5a,r (16)	
				R4a (8)	R4a (8)	R5a (8)	R5a (8)	
						R4a (8)	R4a (8)	R5a (8)
Week 3	R1r (8)	R1r (8)	R2r (8)	R2r (8)	R3r (8)	R3r (8)		
			R1r (8)	R1r (8)	R2r (8)	R2r (8)	R3r (8)	
Week 4			R4r (8)	R4r (8)	R5r (8)	R5r (8)		
				R4r (8)	R4r (8)	R5r (8)	R5r (8)	

Notes: Male rat groups are shown by blue rectangles; Female rat groups are shown by orange rectangles; Inhalation exposures are shown as filled rectangles; Motor activity and FOB assays are shown as open rectangles; Necropsies are shown as dashed rectangles; Animal groups are designated as R: replicate, 1-5: replicate number, a or r: acute or recovery cohort (a,r: both acute and recovery cohort); Number of animals (n) shown in parentheses























### 3.8 Two-Week Inhalation Study Specific Methods

Animals were exposed in two replicates in order to accommodate neurobehavioral testing at the end of the exposure regimen. Each replicate consisted of 40 male or 40 female rats. Table 4 provides the assignment of animals by cage card number in each replicate. Table 5 shows the three-week testing schedule that was used for these replicates.

**Table 4. Two-Week Inhalation Study Replicates with Animal Cage Numbers**

	Exposure Concentration (mg/m <sup>3</sup> )				Total # of Animals
	0	20	100	300	
<b>Male Rats</b> (Cage Card #)	1	21	41	61	40
	3	23	43	63	
	5	25	45	65	
	69	27	47	67	
	9	29	49	7	
	11	73	51	71	
	13	33	53	31	
	15	35	55	75	
	17	37	57	77	
	19	39	59	79	
<b>Female Rats</b> (Cage Card #)	2	22	42	62	40
	4	24	44	64	
	6	26	46	66	
	28	58	48	38	
	10	30	50	70	
	12	32	52	72	
	14	34	54	74	
	16	36	56	76	
	18	68	8	78	
	20	40	60	80	

**Table 5. Two-Week Inhalation Study Staggered Exposure, Neurotoxicity Assays, and Necropsy Schedule**

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>Week 1</b>							
<b>Week 2</b>	 	 	 	 FOB 	 MA 	 Necropsy	
<b>Week 3</b>				 FOB	 MA	 Necropsy	

Notes: Solid blue rectangles indicate exposures days for 40 male rats; Solid orange rectangles indicate exposure days for 40 female rats; Dashed rectangles indicate necropsy days

## 4.0 ACUTE INHALATION STUDY RESULTS

### 4.1 Exposure Conditions

The concentration of PAO in the exposure chambers was monitored using 47 mm gravimetric filters and was measured near continuously during each six-hour exposure period on individual exposure days 1 through 5. The study average concentrations are listed in Table 6. The average concentration on each exposure (replicate) day was within 2.5 percent of the study average concentration (last row of Table 6). The study average concentrations were within 2 percent of the target concentration for each exposure group. It is noteworthy that visibility through the highest concentration (1000 mg/m<sup>3</sup>) exposure chamber was decreased during exposure due to the aerosol content; all animals from this chamber in each replicate were wet with PAO fluid when removed from the chamber. In-study visibility in the intermediate exposure chamber was also decreased but to a lesser extent. More detailed exposure condition data can be found in Appendix C.

**Table 6. Acute Study Target and Measured Exposure Concentrations**

Exposure Group	Control	Low	Intermediate	High
Target Concentration	0 mg/m <sup>3</sup>	100 mg/m <sup>3</sup>	500 mg/m <sup>3</sup>	1000 mg/m <sup>3</sup>
Replicate 1	0.70 ± 2.14	98.1 ± 8.1	492.0 ± 10.7	965.9 ± 26.5
Replicate 2	-0.44 ± 0.40	102.0 ± 1.5	485.2 ± 4.5	971.3 ± 4.5
Replicate 3	0.63 ± 0.71	102.5 ± 1.5	490.5 ± 1.6	975.5 ± 8.1
Replicate 4	-0.22 ± 0.24	101.6 ± 1.4	487.6 ± 1.5	985.8 ± 22.0
Replicate 5	0.33 ± 0.51	103.9 ± 1.3	495.6 ± 6.5	1006.2 ± 18.0
Study Average	0.22 ± 1.04	101.8 ± 3.5	490.3 ± 6.4	981.1 ± 22.1

Note: Concentrations were measured utilizing a gravimetric filter method. Measured concentrations are expressed as mean ± standard deviation in mg/m<sup>3</sup>.

The particle size distribution was measured once each day. The overall size distributions (mass median aerodynamic diameter and geometric standard deviation (MMAD (GSD))) are shown in Table 7. These particle sizes are considered to be respirable by rodents.

**Table 7. Acute Study Particle Size Measured during Exposures**

Study Day	Low Chamber (100 mg/m <sup>3</sup> )		Intermediate Chamber (500 mg/m <sup>3</sup> )		High Chamber (1000 mg/m <sup>3</sup> )	
	MMAD (μm)	GSD	MMAD (μm)	GSD	MMAD (μm)	GSD
<b>1</b>	1.95	2.06	1.91	1.96	2.16	1.98
<b>2</b>	1.82	2.11	1.90	2.02	2.16	2.00
<b>3</b>	1.90	2.12	1.91	2.02	2.11	2.07
<b>4</b>	1.80	1.94	1.92	1.93	2.13	1.97
<b>5</b>	1.91	2.03	1.97	1.96	2.16	2.02
<b>Study Average</b>	1.88 ± 0.06	2.05 ± 0.07	1.92 ± 0.03	1.98 ± 0.04	2.14 ± 0.02	2.01 ± 0.04

Notes: Aerosols were measured using a seven stage cascade impactor. Study averages are expressed as mean ± 1 standard deviation. GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter

Aerosol concentration uniformity measurements were conducted post-exposure due to scheduling reasons. The overall results showed that the coefficient of variation of aerosol concentration, including variation across ports and over time, was less than 3.8, 10.1 and 6.9 percent for the low, intermediate, and high concentration chambers, respectively (Table 8).

**Table 8. Acute Study Chamber Uniformity**

Exposure Group	Coefficient of Variation (%)		
	Total Port	Within Port	Between Port
<b>Low</b>	10.7	4.8	9.7
<b>Intermediate</b>	6.7	5.3	3.8
<b>High</b>	6.7	0.5	6.7

The environmental parameters specified in the protocol for relative humidity and air flow were maintained at or near the target set points of 50 percent and 225 L/min, respectively, throughout the entire study. The target temperature of 22 °C was also maintained at or near target with the exception of the first exposure day, during which temperatures exceeded 24 °C by 0.2 °C and 0.8 °C for approximately 90 and 225 minutes in the high exposure chamber and the control chamber, respectively. The average (± standard deviation (SD)) temperatures were 22.8 (± 0.7), 21.4 (± 0.8), 21.6 (± 0.8), and 22.0 (± 0.9) °C, for the 0, 100, 500, and 1000 mg/m<sup>3</sup> chambers,

respectively. The relative humidity averages were 48.4 ( $\pm$  4.2), 47.2 ( $\pm$  4.0), 45.1 ( $\pm$  3.4), and 44.7 ( $\pm$  3.6) percent, respectively (Table 9).

**Table 9. Environmental and Atmosphere Summary for Acute Inhalation Study**

Environmental Parameter	Measure	Exposure Concentration (mg/m <sup>3</sup> )			
		0	100	500	1000
Chamber Temperature (°C)	Mean	22.8	21.4	21.6	22.0
	SD	0.7	0.8	0.8	0.9
Relative Humidity (%)	Mean	48.4	47.2	45.1	44.7
	SD	4.2	4.0	3.4	3.6
Static Pressure (inches of water)	Mean	0.15	-0.27	-0.29	-0.21
	SD	0.05	0.01	0.01	0.02
Air Flow <sup>a</sup> (L/minute)	Mean	227.5	224.0	223.7	224.2
	SD	0.4	0.7	0.3	0.9

Notes: <sup>a</sup>The reported air flow value includes 38 L/minute of aerosol nebulizer air added to the low, intermediate, or high exposure group generation systems; SD: standard deviation

## 4.2 Neurobehavioral Assays

Adult male and female rats were exposed to 0, 100, 500, or 1000 mg/m<sup>3</sup> PAO fluid aerosol once for six hours. Half of the males (40) and females (40) were tested for neurobehavioral effects within two hours post-exposure (acute cohort) and the other half of the males (40) and females (40) were tested 14 days following exposure (recovery cohort). Overall, for both motor activity and FOB, measures in the acute cohort resulted in significant neurobehavioral changes in the exposure groups as compared to the controls for both males and female rats. The 14 day recovery cohort did not display significant differences between exposure groups. Complete results are found in Appendix D.

Measures of general motor activity level in males and females (Tables 10 and 11) showed significant differences between the control exposure group and both the intermediate and high exposure groups. For total distance traveled, the primary measure of exploration and locomotion, male and female animals exposed to either the intermediate or high concentration PAO were significantly less active than control animals. Ambulatory beam breaks (a measure of motion including walking, head swings, etc.), and vertical beam breaks (rearing, a measure of exploratory behavior) were also significantly decreased among the intermediate and high concentration exposed animals, as compared to controls. No significant differences between exposure groups were detected among the recovery cohort male or female rats for any of the motor activity measurements.

For most FOB, including cage side, open field and manipulation tests, no exposure group-related effects were reported for the males and female rats. Only the handling reactivity observations were different between exposure groups in the acute cohort. Both male and female rats exposed



to the highest PAO concentration generally appeared more passive to handling than control animals (Figure 5). This effect was also observed in some of the males and females exposed to the intermediate concentration of PAO in the acute cohort. Handling passivity was not observed in recovery cohort animals 14 days after exposure. Likewise, all other FOB measures indicated no differences between control and exposed animals in the recovery cohort.

**Table 10. Acute Study Male Rat Acute Cohort Neurobehavioral Assay Results**

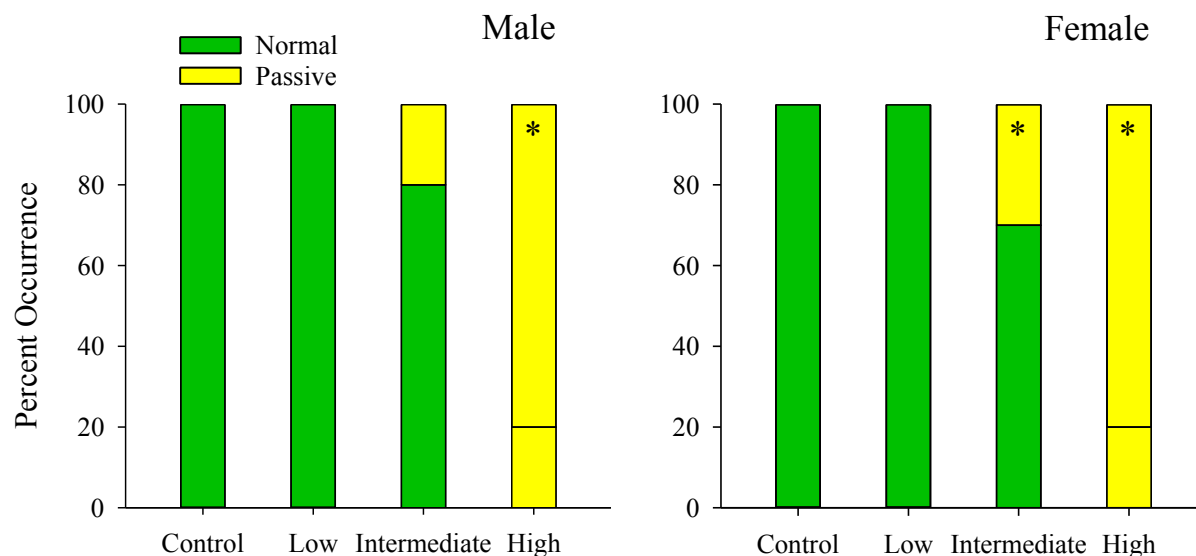
Neurobehavioral Assay	Control Group 0 mg/m <sup>3</sup>	Low Group 100 mg/m <sup>3</sup>	Intermediate Group 500 mg/m <sup>3</sup>	High Group 1000 mg/m <sup>3</sup>
<b>Motor Activity</b>				
<b>Total Distance (cm)</b>	1323 ± 215	1267 ± 94	834 ± 95*	507 ± 77*
<b>Average Speed (cm/second)</b>	3.673 ± 0.165	3.796 ± 0.139	3.796 ± 0.154	3.796 ± 0.180
<b>Time in Center vs. Perimeter (%)</b>	51.6 ± 3.2	44.8 ± 2.7	45.7 ± 2.8	44.5 ± 2.5
<b>Stereotypical Activity (beam breaks)</b>	235.3 ± 14.0	261.7 ± 12.8	236.2 ± 12.9	175.0 ± 28.1
<b>Ambulatory Activity (beam breaks)</b>	2631 ± 428	2506 ± 191	1661 ± 200*	983 ± 142*
<b>Rears (beam breaks)</b>	68.9 ± 13.2	78.4 ± 12.0	29.6 ± 4.4*	18.7 ± 4.3*
<b>FOB</b>				
<b>Forelimb Grip (kg)</b>	0.410 ± 0.040	0.381 ± 0.032	0.410 ± 0.024	0.361 ± 0.021
<b>Hindlimb Grip (kg)</b>	0.027 ± 0.002	0.025 ± 0.002	0.034 ± 0.011	0.031 ± 0.007

Notes: Values are mean ± SEM. \*Indicates significant difference from control value at p < 0.05

**Table 11. Acute Study Female Rat Acute Cohort Neurobehavioral Assay Results**

Neurobehavioral Assay	Control Group 0 mg/m <sup>3</sup>	Low Group 100 mg/m <sup>3</sup>	Intermediate Group 500 mg/m <sup>3</sup>	High Group 1000 mg/m <sup>3</sup>
<b>Motor Activity</b>				
<b>Total Distance (cm)</b>	1145 ± 118	1370 ± 136	470 ± 113*	317 ± 70*
<b>Average Speed (cm/second)</b>	3.370 ± 0.121	3.413 ± 0.155	3.050 ± 0.261	3.176 ± 0.216
<b>Time in Center vs. Perimeter (%)</b>	42.5 ± 2.3	46.7 ± 2.7	45.1 ± 1.9	39.2 ± 4.2
<b>Stereotypical Activity (beam breaks)</b>	258.5 ± 21.9	261.3 ± 14.0	155.8 ± 23.3*	123.4 ± 21.2*
<b>Ambulatory Activity (beam breaks)</b>	2495 ± 261	2981 ± 284	980 ± 244*	663 ± 155*
<b>Rears (beam breaks)</b>	78.9 ± 9.6	98.6 ± 14.0	23.7 ± 7.7*	11.3 ± 2.8*
<b>FOB</b>				
<b>Forelimb Grip (kg)</b>	0.343 ± 0.026	0.285 ± 0.014	0.274 ± 0.021	0.294 ± 0.012
<b>Hindlimb Grip (kg)</b>	0.031 ± 0.009	0.021 ± 0.001	0.021 ± 0.002	0.022 ± 0.002

Notes: Values are mean ± SEM. \*Indicates significant difference from control value at p < 0.05



**Figure 5. Acute Study Acute Cohort FOB Handling Activity.** Male and female rats increased in passivity with increasing exposure concentration (\*p < 0.001).

### 4.3 Body Weight

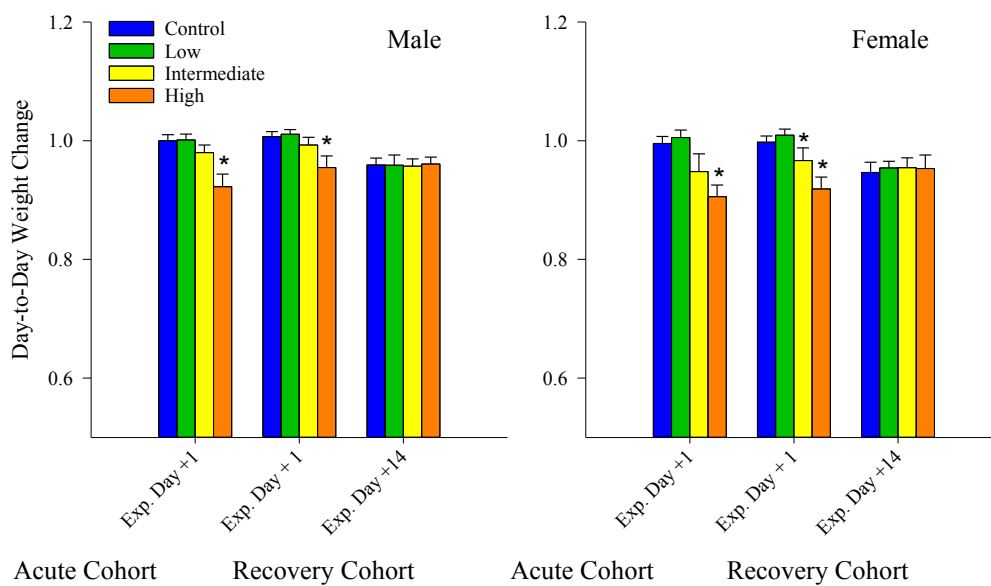
An analysis of variance of the male and female body weights pre-exposure did not show a significant difference after group assignments. Due to the staggered exposures and two-week recovery period, there were varying numbers of body weight measurements for animals in different cohorts and replicates. Additionally, Replicate 5 animals were nine days older than Replicate 1 animals on the day of exposure, leading to body mass differences due to age. Therefore, relative body weight change data were calculated using the exposure event as the reference time point (i.e., relative change is equal to the body weight on the day prior to exposure divided by the body weight on the exposure day).

The weight ratio comparing post-exposure day 1 and the exposure day for the acute cohort showed a dose response decline (Table 12, Figure 6). The ratio in the high concentration group animals was significantly smaller as compared to the ratio in both male and female control rats. The ratio was also smaller among the intermediate group animals, but was only significantly different than controls among the female of this group. Recovery cohort animals were assessed separately as they had not been fasted in preparation for necropsy at this time point. However, the results were similar. The weight ratio was smaller among both male and female rats in the high exposure group and among females in the intermediate exposure group on the day following exposure. By post-exposure day 14, the weight ratio data were not different between exposure groups. Detailed body weight data can be found in Appendix E.

**Table 12. Acute Study Weight Ratio Results**

Exposure Group	Weight Ratio		
	Acute Cohort	Recovery Cohort	Recovery Cohort
	$\frac{PED\ 1}{ED}$	$\frac{PED\ 1}{ED}$	$\frac{PED\ 14}{PED\ 13}$
<b>Male Rats</b>			
<b>Control</b>	1.000 ± 0.010	1.007 ± 0.008	0.959 ± 0.012
<b>Low</b>	1.001 ± 0.010	1.011 ± 0.008	0.959 ± 0.017
<b>Intermediate</b>	0.980 ± 0.013	0.993 ± 0.013	0.957 ± 0.012
<b>High</b>	0.922 ± 0.021*	0.955 ± 0.020*	0.961 ± 0.011
<b>Female Rats</b>			
<b>Control</b>	0.995 ± 0.012	0.998 ± 0.010	0.947 ± 0.017
<b>Low</b>	1.005 ± 0.013	1.009 ± 0.010	0.954 ± 0.011
<b>Intermediate</b>	0.948 ± 0.030*	0.967 ± 0.021*	0.954 ± 0.017
<b>High</b>	0.906 ± 0.020*	0.919 ± 0.020*	0.953 ± 0.023

Notes: Values are mean ± SD. ED: exposure day; PED: post-exposure day

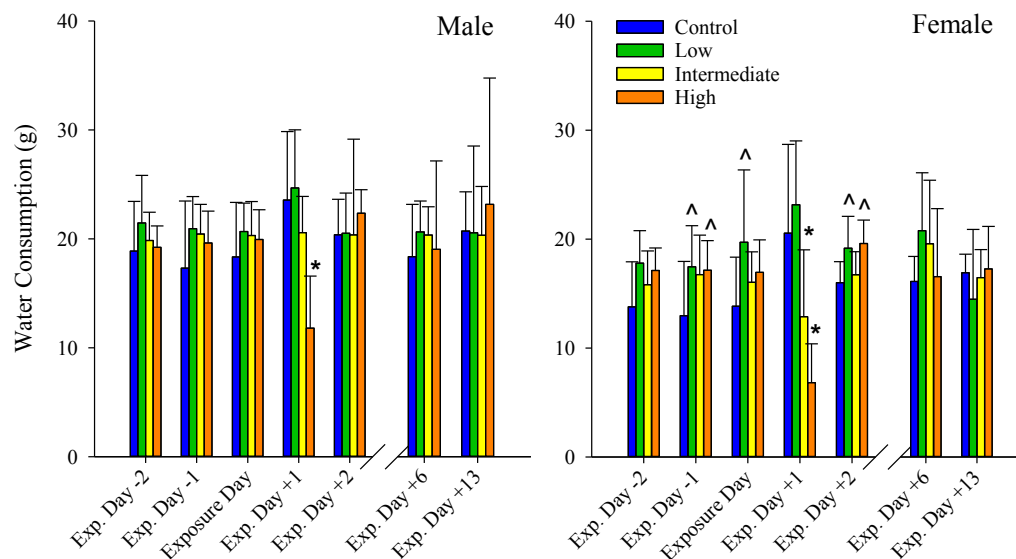


**Figure 6. Proportional Body Weight Changes following Acute Inhalation Study.** Male and female rat body weight changes were calculated for each cohort. \*Indicates significant difference from control at  $p < 0.05$ . Exp. Day =Exposure Day

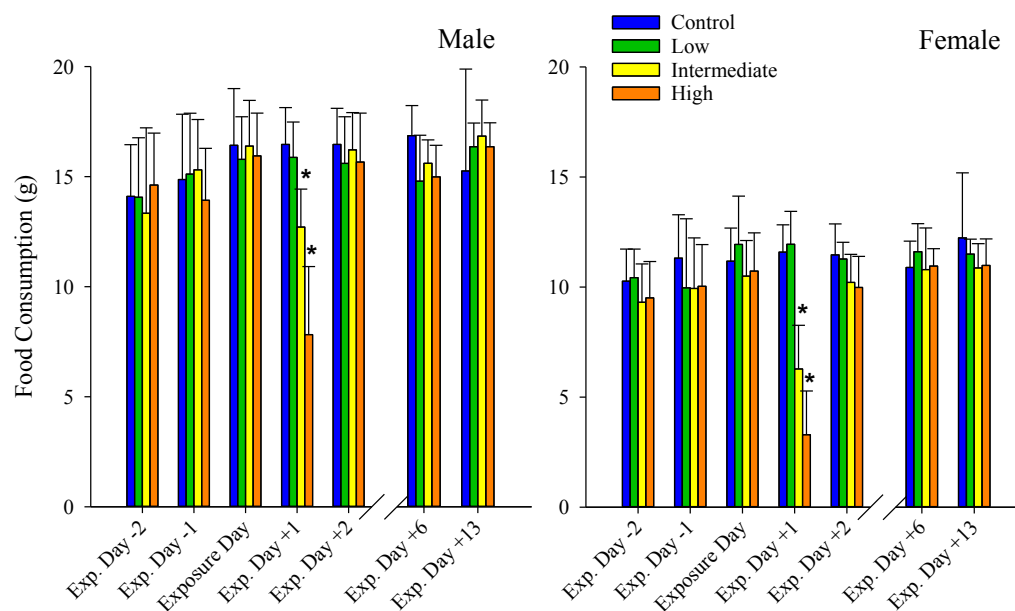
#### 4.4 Food and Water Consumption

Food and water consumption was measured each week day. Total weekend consumption was divided by the number of days and a per-day value was calculated. Water consumption measured on the first post-exposure day was significantly decreased among the high-concentration males and females, and among the intermediate-concentration females (Figure 7). Water consumption measured on post-exposure day 2 indicated that water consumption was approximately the same as before exposure for all exposure groups. Additionally, water consumption at post-exposure days 6 and 13 days showed similar usage as before exposure. Some significant increases in water consumption were noted among the female rats that appear to be unrelated to PAO as they occurred prior to exposure, are not dose-dependent, and are likely attributed to dripping or playing with the sipper nozzles.

Food consumption was significantly decreased on post-exposure day 1 among the high and intermediate concentration exposed males and females (Figure 8). Food measured on post-exposure day 2 was similar to the amount consumed before the exposure for all exposure groups. Additionally, food consumption at post-exposure days 6 and 13 was similar across exposure groups. Complete consumption data can be found in Appendix E.



**Figure 7. Average Daily Water Consumption during Acute Study.** Water consumption in male (left) and female (right) rats significantly decreased (\* $p < 0.05$ ) in the intermediate (female) and highest exposure groups (both male and female rats). Significant increases (^) measured in the female groups appear to be unrelated to exposure as they occurred prior to exposure, are not dose-dependent, and are likely attributed to dripping or playing with the sipper nozzles. Exp. Day =Exposure Day



**Figure 8. Average Daily Food Consumption during Acute Study.** Consumption in male and female rats decreased significantly (\* $p < 0.05$ ) during the day following acute exposure to 500 and 1000  $\text{mg}/\text{m}^3$  PAO. Exp. Day =Exposure Day

#### 4.5 Organ Weights

Organ weight ratios at necropsy for the acute and recovery cohorts are found in Tables 13 and 14, respectively. Direct comparison of organ weights, although available in Appendix F, is not informative as animals were different ages and therefore different weights at the time of exposure; exposure dates spanned more than a week between the first and fifth replicates.

Male and female rats in the high exposure group are shown to have increased relative brain to body weight ratios, as well as decreased liver to body weight and liver to brain weight ratios. Female rats in this exposure group also had decreased kidney to brain weights. Given that the recovery cohorts for both sexes indicated no differences between exposure groups, these acute changes are most likely due to the changes in body weight stemming from decreased food and water consumption among the high exposure group rats.

**Table 13. Acute Study Relative Organ Weight Comparisons at Necropsy in Male Rats**

						Recovery Cohort			
	Control	100 mg/m³	500 mg/m³	1000 mg/m³		Control	100 mg/m³	500 mg/m³	1000 mg/m³
Tissue: Body Weight Ratios									
Brain: BW	0.00942 (0.00073)	0.00926 (0.00048)	0.00978 (0.00053)	0.01038** (0.00100)		0.00802 (0.00037)	0.00845 (0.00044)	0.00842 (0.00063)	0.00843 (0.00043)
L. Kidney: BW	0.00380 (0.00013)	0.00393 (0.00026)	0.00378 (0.00022)	0.00390 (0.00026)		0.00359 (0.00011)	0.00361 (0.00024)	0.00359 (0.00017)	0.00361 (0.00015)
R. Kidney: BW	0.00378 (0.00013)	0.00393 (0.00024)	0.00380 (0.00026)	0.00387 (0.00028)		0.00351 (0.00015)	0.00356 (0.00019)	0.00353 (0.00015)	0.00350 (0.00010)
Adrenals: BW	0.00019 (0.00003)	0.00019 (0.00005)	0.00019 (0.00004)	0.00021 (0.00006)		0.00019 (0.00004)	0.00021 (0.00003)	0.00019 (0.00003)	0.00019 (0.00004)
Liver: BW	0.04359 (0.00296)	0.04285 (0.00220)	0.04189 (0.00275)	0.03990** (0.00222)		0.03644 (0.00264)	0.03519 (0.00319)	0.03585 (0.00326)	0.03661 (0.00354)
Tissue: Brain Weight Ratios									
L. Kidney: Brain	0.406 (0.030)	0.426 (0.037)	0.389 (0.029)	0.379 <sup>LH</sup> (0.040)		0.448 (0.026)	0.428 (0.031)	0.428 (0.035)	0.429 (0.030)
R. Kidney: Brain	0.403 (0.029)	0.425 (0.028)	0.391 (0.028)	0.375 <sup>LH</sup> (0.035)		0.437 (0.023)	0.422 (0.028)	0.421 (0.034)	0.416 (0.026)
Adrenals: Brain	0.020 (0.002)	0.020 (0.006)	0.019 (0.004)	0.020 (0.005)		0.023 (0.005)	0.025 (0.004)	0.023 (0.005)	0.023 (0.004)
Liver: Brain	4.665 (0.597)	4.645 (0.389)	4.298 (0.397)	3.872** (0.381)		4.561 (0.519)	4.170 (0.404)	4.286 (0.546)	4.359 (0.559)

**Notes:** Values in table are mean ( $\pm$  standard deviation); \*\*Significantly different compared to control value and low exposure group value ( $p \leq 0.05$ ); <sup>LH</sup>Statistically significant difference between the low and high exposure group values ( $p \leq 0.05$ , not different from control value)

**Table 14. Acute Study Relative Organ Weight Comparisons at Necropsy in Female Rats**

	Acute Cohort					Recovery Cohort			
	Control	100 mg/m³	500 mg/m³	1000 mg/m³		Control	100 mg/m³	500 mg/m³	1000 mg/m³
Tissue: Body Weight Ratios									
Brain: BW	0.01282 (0.00078)	0.01275 (0.00073)	0.01351 (0.00079)	0.01396** (0.00085)		0.01242 (0.00078)	0.01169 (0.00068)	0.01222 (0.00077)	0.01227 (0.00065)
L. Kidney: BW	0.00407 (0.00018)	0.00391 (0.00018)	0.00398 (0.00024)	0.00407 (0.00028)		0.00370 (0.00023)	0.00355 (0.00018)	0.00357 (0.00016)	0.00380 (0.00024)
R. Kidney: BW	0.00406 (0.00021)	0.00393 (0.00020)	0.00398 (0.00024)	0.00406 (0.00033)		0.00371 (0.00023)	0.00355 (0.00011)	0.00364 (0.00016)	0.00374 (0.00022)
Adrenals: BW	0.00034 (0.00004)	0.00032 (0.00006)	0.00037 (0.00004)	0.00040 <sup>LH</sup> (0.00008)		0.00036 (0.00004)	0.00034 (0.00003)	0.00034 (0.00005)	0.00036 (0.00002)
Liver: BW	0.03905 (0.00163)	0.03835 (0.00156)	0.03805 (0.00168)	0.03671** (0.00159)		0.03156 (0.00217)	0.03098 (0.00109)	0.03197 (0.00179)	0.03142 (0.00139)
Tissue: Brain Weight Ratios									
L. Kidney: Brain	0.318 (0.020)	0.307 (0.021)	0.295* (0.017)	0.292* (0.017)		0.298 (0.016)	0.304 (0.020)	0.293 (0.013)	0.311 (0.030)
R. Kidney: Brain	0.317 (0.019)	0.309 (0.020)	0.295 (0.023)	0.291* (0.024)		0.300 (0.019)	0.305 (0.018)	0.298 (0.016)	0.306 (0.030)
Adrenals: Brain	0.026 (0.003)	0.025 (0.004)	0.028 (0.004)	0.029 (0.005)		0.029 (0.003)	0.029 (0.003)	0.028 (0.002)	0.029 (0.002)
Liver: Brain	3.056 (0.219)	3.017 (0.226)	2.829 (0.258)	2.638** (0.181)		2.551 (0.243)	2.656 (0.153)	2.626 (0.222)	2.570 (0.229)

**Notes:** Values in table are mean ( $\pm$  standard deviation); \*Significantly different compared to control value ( $p \leq 0.05$ ); \*\*Significantly different compared to control value and low exposure group value ( $p \leq 0.05$ ); <sup>LH</sup>Statistically significant difference between the low and high exposure group values ( $p \leq 0.05$ , not different from control value)

#### 4.6 Clinical Chemistry and Hematology

Clinical chemistry parameters were measured in blood samples taken from the 14-day recovery cohort animals at the time of necropsy. There were no exposure group-related differences in any of the measured clinical chemistry parameters (Tables 15 and 16). No significant differences were measured between exposure groups.



**Table 15. Clinical Chemistry Results in Acute Study Recovery Cohort Male Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (100 mg/m <sup>3</sup> )		Intermediate (500 mg/m <sup>3</sup> )		High (1000 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Albumin (g/dL)	3.12	0.2	2.98	0.1	2.95	0.2	2.95	0.1
Alkaline phosphatase (U/L)	199.4	13.0	196.2	29.8	189.2	38.4	198	23.6
Alanine transaminase (U/L)	70.2	12.4	62.9	9.6	59.8	10.6	59.2	8.5
Aspartate aminotransferase (U/L)	63.2	8.0	68.9	14.8	67.5	18.3	59.1	6.2
Blood urea nitrogen (mg/dL)	17.5	2.2	17.7	1.4	17	1.8	17	1.7
Cholesterol (mg/dL)	60.4	4.4	58.4	6.4	53.5	5.9	59.6	5.9
Creatine kinase (U/L)	299.7	57.3	345.8	186.8	360.3	218.2	274.7	53.9
Creatinine (mg/dL)	0.24	0.05	0.2	0.04	0.19	0.05	0.22	0.06
Globulins (g/dL)	2.7	0.1	2.7	0.1	2.73	0.2	2.67	0.1
Glucose (mg/dL)	193.9	30.8	186.7	26.4	181.9	31.3	182.9	22.6
Total protein (g/dL)	5.81	0.3	5.67	0.2	5.66	0.3	5.59	0.2
Triglycerides (mg/dL)	113.1	42.7	107.9	33.8	81.8	21.5	98.8	33.5
Na <sup>+</sup> (Sodium, mmol/L)	145.7	0.6	145	1.2	145.4	1.0	145	0.6
K <sup>+</sup> (Potassium, mmol/L)	4.75	0.7	4.78	0.9	4.47	0.5	4.47	0.3
Cl <sup>-</sup> (Chloride, mmol/L)	102.6	1.1	103.6	1.4	103.8	1.1	103.6	1.0

Notes: SD: standard deviation; dL: deciliter; U: international unit

**Table 16. Clinical Chemistry Results in Acute Study Recovery Cohort Female Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (100 mg/m <sup>3</sup> )		Intermediate (500 mg/m <sup>3</sup> )		High (1000 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Albumin (g/dL)	2.87	0.1	2.94	0.1	2.94	0.1	2.87	0.2
Alkaline phosphatase (U/L)	136.8	27.3	127.6	25.0	135.6	19.4	134.3	19.8
Alanine transaminase (U/L)	47.6	9.8	59.9	12.0	53.3	11.1	54.6	9.3
Aspartate aminotransferase (U/L)	69.4	15.9	71.4	18.5	64.6	9.5	108.6	124.1
Blood urea nitrogen (mg/dL)	16.5	1.8	16.9	1.8	16.8	1.9	17.5	1.7
Cholesterol (mg/dL)	79.4	5.7	80.1	4.7	83.5	5.9	79.4	6.5
Creatine kinase (U/L)	372.4	227.5	386.9	224.3	386.5	282.4	330	90.2
Creatinine (mg/dL)	0.19	0.03	0.18	0.04	0.2	0.04	0.17	0.05
Globulins (g/dL)	2.6	0.2	2.65	0.2	2.54	0.1	2.61	0.2
Glucose (mg/dL)	161.2	23.8	158.7	25.3	159.3	31.1	156.3	17.8
Total protein (g/dL)	5.5	0.3	5.57	0.4	5.46	0.2	5.46	0.3
Triglycerides (mg/dL)	24.3	3.8	25.3	7.7	26.3	4.1	29.7	7.7
Na <sup>+</sup> (Sodium, mmol/L)	145.5	0.8	145.1	1.2	145.2	1.2	145	1.2
K <sup>+</sup> (Potassium, mmol/L)	4.61	0.7	4.63	0.8	4.63	0.6	4.6	0.7
Cl <sup>-</sup> (Chloride, mmol/L)	104.8	0.7	105.4	0.8	105.1	1.2	105.6	1.0

Notes: SD: standard deviation; dL: deciliter; U: international unit

Tables 17 and 18 show the hematology results for the male and female recovery cohort rats, respectively. Some hematology parameters were flagged as statistically significant. The basophil counts and percentages in the males from the high concentration exposure group were low compared with controls. The number and percent of eosinophils in the low and intermediate exposure group females were statistically different from each other.

The number of platelets in the high exposure group males was increased compared with low exposure group males. The intermediate exposure group females had significantly more platelets than the low or high concentration females. However, these values bracketed the control animals, and were not statistically different from control platelet numbers. Complete clinical chemistry and hematology data can be found in Appendix G.

**Table 17. Hematology Results in Acute Study Recovery Cohort Male Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (100 mg/m <sup>3</sup> )		Intermediate (500 mg/m <sup>3</sup> )		High (1000 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
White blood cells (# x 10 <sup>3</sup> /μL)	7.85	1.38	7.53	1.76	7.05	2.20	7.87	1.06
Neutrophils (# x 10 <sup>3</sup> /μL)	1.91	0.42	1.65	0.49	1.65	0.69	1.73	0.37
Lymphocytes (# x 10 <sup>3</sup> /μL)	5.64	1.09	5.67	1.32	5.22	1.51	5.97	0.82
Monocytes (# x 10 <sup>3</sup> /μL)	0.25	0.17	0.19	0.21	0.17	0.11	0.17	0.10
Eosinophils (# x 10 <sup>3</sup> /μL)	0.03	0.04	0.02	0.03	0.01	0.02	0.01	0.01
Basophils (# x 10 <sup>3</sup> /μL)	0.02	0.03	0.00	0.01	0.00	0.01	<b>0.00*</b>	0.00
Neutrophils (%)	24.51	4.54	21.84	4.28	22.06	6.07	21.95	3.24
Lymphocytes (%)	71.79	4.95	75.65	3.85	75.48	6.36	75.88	3.65
Monocytes (%)	3.13	2.15	2.23	2.16	2.24	1.21	2.10	1.13
Eosinophils (%)	0.35	0.46	0.21	0.32	0.15	0.32	0.07	0.09
Basophils (%)	0.21	0.39	0.07	0.16	0.07	0.12	<b>0.00*</b>	0.00
Red blood cells (# x 10 <sup>6</sup> /μL)	9.08	0.69	8.82	0.83	8.86	0.52	9.01	0.44
Hemoglobin (g/dL)	15.08	1.29	14.70	1.65	14.87	1.16	15.06	0.78
Hematocrit (%)	41.77	4.87	39.71	3.76	39.83	3.21	40.20	2.09
Mean corpuscular volume (fL)	45.88	2.86	45.08	2.36	44.93	1.96	44.63	1.82
Mean corpuscular hemoglobin (pg)	16.60	0.55	16.63	0.58	16.78	0.60	16.71	0.59
Mean corpuscular hemoglobin concentration (g/dL)	36.29	2.20	37.00	2.29	37.36	1.44	37.49	1.56
Red blood cell distribution width (%)	17.51	0.59	17.43	0.46	17.74	0.64	17.65	0.60
Platelets (# x 10 <sup>3</sup> /μL)	695.94	99.79	<b>608.25<sup>H</sup></b>	241.25	717.25	83.65	<b>729.61<sup>L</sup></b>	55.25
Mean Platelet Volume (fL)	6.09	1.21	5.85	2.53	5.54	0.26	5.73	0.22

Notes: \*Different from control (p<0.05); <sup>H, I, L</sup> Different from superscripted group (high, intermediate, low; (p<0.05)); SD: standard deviation; dL: deciliter; fL: femtoliter; pg: picogram

**Table 18. Hematology Results in Acute Study Recovery Cohort Female Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (100 mg/m <sup>3</sup> )		Intermediate (500 mg/m <sup>3</sup> )		High (1000 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
White blood cells (# x 10 <sup>3</sup> /μL)	6.15	1.69	5.66	1.58	5.89	1.54	5.52	1.67
Neutrophils (# x 10 <sup>3</sup> /μL)	0.92	0.37	0.79	0.38	0.83	0.36	0.84	0.42
Lymphocytes (# x 10 <sup>3</sup> /μL)	5.13	1.35	4.78	1.21	4.96	1.33	4.58	1.26
Monocytes (# x 10 <sup>3</sup> /μL)	0.09	0.04	0.08	0.05	0.09	0.08	0.08	0.07
Eosinophils (# x 10 <sup>3</sup> /μL)	0.00	0.01	<b>0.01<sup>I</sup></b>	0.01	<b>0.00<sup>L</sup></b>	0.00	0.01	0.01
Basophils (# x 10 <sup>3</sup> /μL)	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01
Neutrophils (%)	14.36	4.08	13.11	3.99	13.67	5.25	14.27	4.46
Lymphocytes (%)	83.98	3.83	85.34	4.23	84.59	5.22	84.07	4.67
Monocytes (%)	1.53	0.63	1.32	0.70	1.70	1.34	1.44	0.97
Eosinophils (%)	0.08	0.09	<b>0.16<sup>I</sup></b>	0.22	<b>0.02<sup>L</sup></b>	0.06	0.15	0.17
Basophils (%)	0.05	0.07	0.07	0.10	0.02	0.05	0.07	0.16
Red blood cells (# x 10 <sup>6</sup> /μL)	8.62	0.41	8.72	0.54	8.74	0.51	8.63	0.37
Hemoglobin (g/dL)	14.63	0.87	14.77	0.85	14.68	1.15	14.38	0.90
Hematocrit (%)	41.00	2.28	40.91	2.59	40.96	2.69	40.23	2.58
Mean corpuscular volume (fL)	47.58	1.42	46.96	1.51	46.85	1.50	46.63	1.88
Mean corpuscular hemoglobin (pg)	16.97	0.55	16.95	0.30	16.77	0.65	16.68	0.56
Mean corpuscular hemoglobin concentration (g/dL)	35.69	1.37	36.14	1.28	35.85	1.77	35.76	1.20
Red blood cell distribution width (%)	16.24	0.76	16.53	0.71	16.51	0.74	16.32	0.55
Platelets (# x 10 <sup>3</sup> /μL)	634.57	181.85	<b>518.18<sup>I</sup></b>	193.77	<b>714.83<sup>LH</sup></b>	55.22	<b>555.00<sup>I</sup></b>	157.15
Mean Platelet Volume (fL)	7.64	3.11	6.01	0.50	5.61	0.24	5.93	0.43

Notes: \*Different from control (p<0.05); <sup>H, I, L</sup> Different from superscripted group (high, intermediate, low; (p<0.05)); SD: standard deviation; dL: deciliter; fL: femtoliter; pg: picogram

## 4.7 Histopathology

The incidence and severity of effects for nasal cavity sections (nasal levels NL3, NL4) and lungs are shown in Table 19; drawings depicting these sections are found in Figure 4. The description of effects are described below. No effects were seen in the first (NL1) and second (NL2) sections of the nasal cavities; therefore these results were not included in the table nor discussed below. Complete results can be found in Appendix H.

**4.7.1 Low Exposure Group - Nasal Cavities.** In the nasal cavities of the acute cohort low exposure group rats, the only effects were seen in the most posterior section, NL4. Fifty percent of the rats presented with lesions that were, on average, minimal in severity (0.9 severity rating).

However, in eight of the ten rats that displayed a lesion, the severity score was mild (severity = 2). Most lesions were classified as degeneration with necrosis (9 rats); a single rat developed only degeneration of the epithelium without necrotic evidence. Lesions were not limited to one site but were multifocal in all ten rats; lesions were more extensive in two of the rats with mild degeneration and necrosis. Two of the ten rats with lesions were rated as having only minimal multifocal degeneration and necrosis in the NL4 section of nasal cavities.

In the recovery cohort, the NL4 section of one rat was not available for analysis. Recovery was complete for 18 out of 19 rats. One rat still had minimal multifocal degeneration.

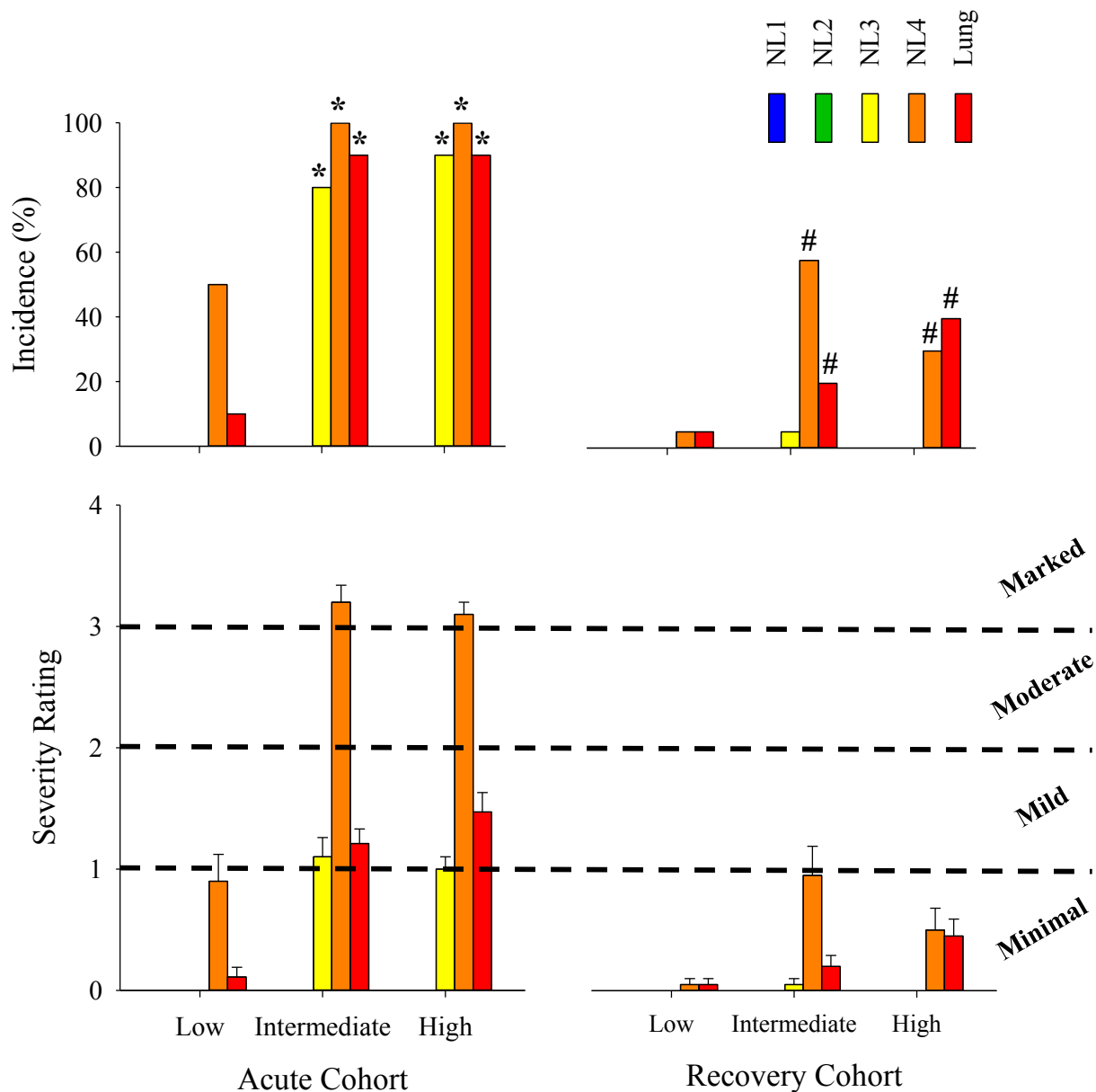
**4.7.2 Low Exposure Group - Lungs.** In the lungs of acute cohort low exposure group rats, two of 18 rats had mononuclear cell inflammation that was focal in one rat and multifocal in the other, with a resulting mean severity score of 0.11. Two additional rats in this exposure group (2 of 20) presented with multifocal hemorrhages consistent with euthanasia unrelated to PAO exposure.

In the recovery cohort, only one rat had an effect that was a single area of minimal ossification. As this was a focal effect in a recovery group and the only occurrence in the entire acute study, the relevance to PAO exposure is questionable. There was no incidence of inflammation, hemorrhage, necrosis or degeneration in the lungs of the low exposure group recovery group rats.

**Table 19. Incidence and Severity for Tissue Sections from Rats Exposed to PAO Aerosol in Acute Study with Recovery Cohort**

Tissue Section	Acute Cohort				Recovery Cohort			
	Control (0 mg/m <sup>3</sup> )	Low (100 mg/m <sup>3</sup> )	Intermediate (500 mg/m <sup>3</sup> )	High (1000 mg/m <sup>3</sup> )	Control (0 mg/m <sup>3</sup> )	Low (100 mg/m <sup>3</sup> )	Intermediate (500 mg/m <sup>3</sup> )	High (1000 mg/m <sup>3</sup> )
<b>Incidence</b>								
NL3	0	0	16/20 (80%)	18/20 (90%)	0	0	1/20 (5%)	0
NL4	0	10/20 (50%)	20/20 (100%)	20/20 (100%)	0	1/20 (5%)	11/19 (58%)	6/20 (30%)
Lung	0	2/20 (10%)	18/20 (90%)	18/20 (90%)	0	1/20 (5%)	4/20 (20%)	8/20 (40%)
<b>Severity</b>								
NL3	0	0	1.10 ± 0.16	1.00 ± 0.10	0	0	0.05 ± 0.05	0
NL4	0	0.90 ± 0.22	3.20 ± 0.14	3.10 ± 0.10	0	0.05 ± 0.05	0.95 ± 0.24	0.50 ± 0.18
Lung	0	0.11 ± 0.08	1.21 ± 0.12	1.47 ± 0.16	0	0.05 ± 0.05	0.20 ± 0.09	0.45 ± 0.14

Notes: Nasal Level (NL) 1 and 2 had no incidence of lesions and are not shown in the table. Incidence units = number of rats with effects/n (% number of rats with effects); Severity units = mean ± standard error of the mean; Severity ratings: 0 = Normal, 1 = Minimal/Rare, 2 = Mild, 3 = Moderate, 4 = Marked, 5 = Severe



**Figure 9. Histopathological Incidence and Severity of Nasal Tissues and Lungs for Male and Female Rats Combined.** The drawings in Figure 4 indicate the nasal cavity tissue sections (NL1 through NL4) or lung tissue by corresponding color. No effects were seen in NL1 or NL2. Drawings adapted from Young (1981) and Nawata *et al.* (1997), respectively. Significance markings indicate that exposure group and incidence are related (\* $p < 0.001$ , # $p < 0.01$ ).

**4.7.3 Intermediate Exposure Group - Nasal Cavities.** In acute cohort rats exposed to the intermediate concentration of PAO, effects were seen in both of the posterior sections of the nasal cavities, NL3 and NL4. In the NL3 section, multifocal degeneration with necrosis was seen in 80 percent (16 out of 20) of the rats with a mean severity score of 1.1 (minimal). Individual severity scores were categorized as minimal in ten rats and mild in the other six rats.

In the NL4 section of nasal cavities, 100 percent of the rats were found to have multifocal degeneration with necrosis. The mean severity score was 3.2 or moderate. In 16 rats, the lesions were extensive. In 12 out of those 16 rats, edema was also present. In six out of the 16 rats with extensive multifocal effects, the severity score was a 4 (marked), while two rats had lesions of mild severity.

Among the recovery cohort intermediate exposure rats, recovery in the NL3 section was complete in 19 out of 20 rats. However, one rat still had minimal multifocal degeneration with necrosis.

In contrast, in the NL4 section, recovery was seen in only eight out of 19 rats; one NL4 section was not available for analysis. Severity of lesions ranged from extensive multifocal degeneration, necrosis, edema and neutrophilic inflammation that was moderate (severity = 3) in two rats, to minimal multifocal neutrophilic inflammation in five rats. In between were two rats with multifocal degeneration (1 mild, 1 moderate); one rat with mild multifocal neutrophilic inflammation, degeneration and regeneration; and one rat with mild multifocal neutrophilic inflammation, degeneration and necrotic debris. Mean lesion severity was 0.95.

**4.7.4 Intermediate Exposure Group – Lungs.** Following the acute intermediate PAO exposure, 18 out of 20 rats (90 percent) showed exposure related lesions. The overall mean severity score was 1.21, which is essentially a minimal response. However, five of the 18 rats had individual severity scores of two, which indicates a mild effect. All 18 rats had multifocal inflammation; 11 rats were classified with neutrophilic inflammation, six rats with mononuclear, and one rat with both neutrophilic and mononuclear. For the five rats with the mild severity score of 2, three had neutrophilic inflammation and two had mononuclear inflammation. A single rat of the 20 showed normal tissue. The remaining rat in this exposure group presented with multifocal hemorrhage consistent with euthanasia protocol; the lesion is unrelated to PAO exposure.

In the recovery cohort, 16 out of 20 rats had lungs that were fully recovered. The four rats that were not yet recovered displayed multifocal minimal neutrophilic inflammation. As a result, the overall group mean severity score was 0.2.

**4.7.5 High Exposure Group - Nasal Cavities.** In the NL3 sections of the high exposure acute cohort rats, only two rats out of 20 had normal epithelium, while 13 out of 20 rats developed minimal (11 rats) to mild (2 rats) multifocal necrosis (90 percent incidence total). The overall severity score was 1.0, which is considered minimal. One rat had a focal area of mild neutrophilic inflammation and necrosis, while four rats showed mild neutrophilic inflammation and multifocal necrosis.

In the most posterior section (NL4), multifocal neutrophilic inflammation and necrosis were found in seven of 20 rats, ranging from mild (one rat) to moderate (six rats) severity. Additionally, eight rats developed moderate, multifocal necrosis; it was considered extensive in

half of these rats. Four rats had extensive multifocal neutrophilic inflammation plus necrosis that was moderate in two rats, but marked (severity = 4) in the other two. One rat had marked (severity = 4) multifocal neutrophilic inflammation, necrosis and edema. In summation, all 20 rats presented with a lesion of some type, with a mean severity score of 3.10.

In the recovery cohort, there was 100 percent recovery in the NL3 tissues. In the NL4 tissues, there was only 70 percent recovery; six rats did not return to normal. Four rats still showed necrotic debris of mild severity; three were multifocal and one was only focal. Two of the multifocal rats also showed regeneration, which is indicative of recovery. The remaining multifocal rat with necrotic debris still had degeneration occurring in some locations. The rat with the focal effect showed regeneration, but still had indications of neutrophilic inflammation; recovery had begun but adverse effects were still present. Finally, one of the six non-normal rats showed minimal multifocal regeneration indicating recovery, while the remaining animal still had multifocal minimal necrosis and degeneration.

**4.7.6 High Exposure Group – Lungs.** Among the acute cohort high exposure group, one rat had normal lungs while 17 out of 20 rats had neutrophilic inflammation ranging from minimal (10 rats) to mild (7 rats). Of the remaining two rats out of the 20, one had mild, mixed multifocal inflammation (both mononuclear and neutrophilic), while the other rat had a severity score of moderate (severity = 3) with focally extensive neutrophilic inflammation, necrosis and edema. The mean severity score was 1.45 (mild).

In the recovery cohort, there were 12 out of 20 rats (60 percent) that had recovered completely after two weeks. Of the eight rats with lesions (40 percent incidence), four still showed minimal (severity = 1) multifocal neutrophilic inflammation. The other four had granulomatous lungs; two were minimal and multifocal and two were focal with one minimal and the other mild severity ratings. Overall, the mean severity score was 0.45 (minimal).

## **5.0 TWO-WEEK INHALATION STUDY RESULTS**

### **5.1 Exposure Conditions**

Prior to the start of exposures, the exposure chambers were evaluated for uniformity of distribution of the generated PAO aerosol within the chambers. Aerosol concentration measurements were recorded by an optical particle counter at various locations inside the chamber. The results (Table 20) showed that the variation in aerosol concentration was 11.1 percent or less among the various ports in each chamber. Detailed exposure condition information can be found in Appendix I.



**Table 20. Two-Week Study Chamber Uniformity**

Exposure Group	Coefficient of Variation (%)		
	Total Port	Within Port	Between Port
Low	3.8	1.9	3.3
Intermediate	10.1	7.0	7.3
High	6.9	11.1	8.8

Temperature, humidity, air flow, static pressure, and PAO concentration were continually monitored and recorded every two minutes during the pre-exposure, exposure and post-exposure periods. The humidity, static pressure and air flow remained at or near targets, and did not deviate outside of the ranges specified in the protocol. The temperature deviated above 24° C on the first day of exposures; daily average temperatures were 25.9, 25.2, 25.2 and 24.2 °C for the 0, 20, 100, and 300 mg/m<sup>3</sup> chambers, respectively. The overall average temperatures were 22.9 (± 1.1), 21.7 (± 1.2), 22.0 (± 1.2) and 21.9 (± 0.9) °C, for males (Table 21) and 22.2 (± 0.6), 21.1 (± 0.7), 21.4 (± 0.4) and 21.6 (± 0.5) °C, for females (Table 22) for the 0, 20, 100, and 300 mg/m<sup>3</sup> chambers, respectively.

As the PAO is a non-volatile liquid, it forms an aerosol when sprayed into the generation system. The concentration of PAO in the exposure chambers was measured using 47 mm gravimetric filters and was monitored continuously using the optical real-time aerosol monitor (RAM) during each exposure period. The continuous monitoring data generally showed a stable concentration over the course of an exposure. The RAM average concentrations (and SD) were 0.0 (± 0.0), 18.9 (± 0.5), 95.6 (± 2.4) and 289.4 (± 6.6) mg/m<sup>3</sup> for males (Table 21), and 0.0 (± 0.0), 18.9 (± 0.6), 95.1 (± 2.2) and 286.1 (± 3.5) for females (Table 22) for the 0, 20, 100, and 300 mg/m<sup>3</sup> chambers, respectively. These values compare well with the gravimetric filter data; gravimetric filter average concentrations and standard deviations were 20.3 (± 1.4), 102.1 (± 5.4) and 302.6 (± 18.8) mg/m<sup>3</sup> for males (Table 21), and 20.3 (± 0.8), 99.6 (± 5.2), and 293.5 (± 15.6) for females, referring to the 20, 100, and 300 mg/m<sup>3</sup> chambers, respectively (Table 22). Only one gravimetric filter sample was taken from the control chamber on the first day of the study to verify the RAM reading of zero. The study average concentrations for the exposure chambers were all within 2.2 percent of the target concentration. The average concentration for each exposure day was within 7 percent of the study average concentration.

Particle size measurements were made using a cascade impactor that sampled periodically from each exposure chamber. The average mass MMAD (GSD) were calculated as 1.91 (1.77), 2.30 (1.95) and 2.19 (1.83) µm for males (Table 21), and 1.91 (1.88), 2.44 (1.84) and 2.37 (1.89) µm for females (Table 22) for the low, intermediate and high concentration chambers, respectively. Aerosols with particle size distributions between 1 and 4 µm are generally considered as respirable by rodents (OECD, 2009).

**Table 21. Summary of Environmental Parameters for Male Rats**

Environmental Parameter	Measure	Exposure Concentration (mg/m <sup>3</sup> )			
		0	20	100	300
Chamber Temperature (°C)	Mean	22.9	21.7	22.0	21.9
	SD	1.1	1.2	1.2	0.9
Relative Humidity (%)	Mean	45.7	48.1	47.4	45.5
	SD	9.1	9.0	9.1	9.3
Static Pressure (inches of water)	Mean	0.023	-0.039	-0.040	-0.037
	SD	0.012	0.008	0.007	0.010
Air Flow <sup>a</sup> (L/minute)	Mean	227.1	209.1	202.7	209.1
	SD	2.3	1.1	1.1	1.4
Concentration (Optic RAM, µm)	Mean	0.001	18.9	95.6	289.4
	SD	0.000	0.5	2.4	6.6
Concentration (Gravimetric Filter, µm)	Mean	0.00	20.3	102.1	302.6
	SD	--	1.4	5.4	18.8
Gravimetric Filter : Target Concentration	%	--	101	102	101
Cascade Impactor Particle Size (µm)	MMAD	--	1.91	2.30	2.19
	GSD	--	1.77	1.95	1.83
Optical Particle Size (µm)	MMAD	2.07	1.62	2.57	1.71
	GSD	1.89	1.51	1.63	1.37

Notes: <sup>a</sup>Measured air flow value prior to the addition of aerosol nebulizer air flow, where the sum is equivalent to the control measured air flow value; --: Not measured or calculated; GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter; RAM: real-time aerosol monitor; SD: standard deviation

**Table 22. Summary of Environmental Parameters for Female Rats**

Environmental Parameter	Measure	Exposure Concentration (mg/m <sup>3</sup> )			
		0	20	100	300
Chamber Temperature (°C)	Mean	22.2	21.1	21.4	21.6
	SD	0.6	0.7	0.4	0.5
Relative Humidity (%)	Mean	44.6	45.6	45.3	43.1
	SD	8.2	9	9	8.6
Static Pressure (inches of water)	Mean	0.024	-0.056	-0.045	-0.048
	SD	0.017	0.029	0.004	0.004
Air Flow <sup>a</sup> (L/minute)	Mean	228.1	208.2	203	209
	SD	1.9	2.6	0.7	0.8
Concentration (Optic RAM, µm)	Mean	0.001	18.9	95.1	286.1
	SD	0.001	0.6	2.2	3.5
Concentration (Gravimetric Filter, µm)	Mean	--	20.3	99.6	293.5
	SD	--	0.8	5.2	15.6
Gravimetric Filter : Target Concentration	%	--	102	100	98
Cascade Impactor Particle Size (µm)	MMAD	--	1.91	2.44	2.37
	GSD	--	1.88	1.84	1.89
Optical Particle Size (µm)	MMAD	2.18	1.74	1.39	1.34
	GSD	2.22	1.59	1.52	1.47

Notes: <sup>a</sup>Measured air flow value prior to the addition of aerosol nebulizer air flow; add 17, 23, or 17 L air/min to the low, intermediate, or high exposure group generation systems, respectively; --: Not measured or calculated; GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter; RAM: real-time aerosol monitor; SD: standard deviation

## 5.2 Neurobehavioral Assays

For all motor activity and FOB measures, no significant differences between exposure groups were reported for either the males (Table 23) or the females (Table 24). Complete neurobehavioral results can be found in Appendix J.

**Table 23. Two-Week Study Male Rat Neurobehavioral Assay Results**

Neurobehavioral Assay	Control Group 0 mg/m <sup>3</sup>	Low Group 20 mg/m <sup>3</sup>	Intermediate Group 100 mg/m <sup>3</sup>	High Group 300 mg/m <sup>3</sup>
<b>Motor Activity</b>				
<b>Total Distance (cm)</b>	1615 ± 171	1612 ± 127	1625 ± 191	1837 ± 189
<b>Total Activity (seconds)</b>	959 ± 53	969 ± 53	976 ± 52	975 ± 66
<b>Average Speed (cm/second)</b>	4.155 ± 0.092	4.097 ± 0.081	4.082 ± 0.102	4.297 ± 0.079
<b>Time in Center vs. Perimeter (%)</b>	53.0 ± 2.2	48.9 ± 2.6	47.4 ± 3.2	50.1 ± 2.3
<b>Stereotypical Activity (beam breaks)</b>	257.8 ± 6.3	258.1 ± 6.8	247.3 ± 10.9	268.8 ± 11.7
<b>Total Ambulatory (beam breaks)</b>	3036 ± 319	3001 ± 219	3035 ± 356	3444 ± 348
<b>Vertical Rears (beam breaks)</b>	88.6 ± 13.1	88.3 ± 14.9	103.5 ± 37.9	97.6 ± 20.0
<b>FOB</b>				
<b>Forelimb Grip Strength (kg)</b>	0.501 ± 0.025	0.458 ± 0.024	0.433 ± 0.018	0.457 ± 0.021
<b>Hindlimb Grip Strength (kg)</b>	0.188 ± 0.016	0.192 ± 0.020	0.167 ± 0.011	0.172 ± 0.015

Note: Values are mean ± SEM (n=10)

**Table 24. Two-Week Study Female Rat Neurobehavioral Assay Results**

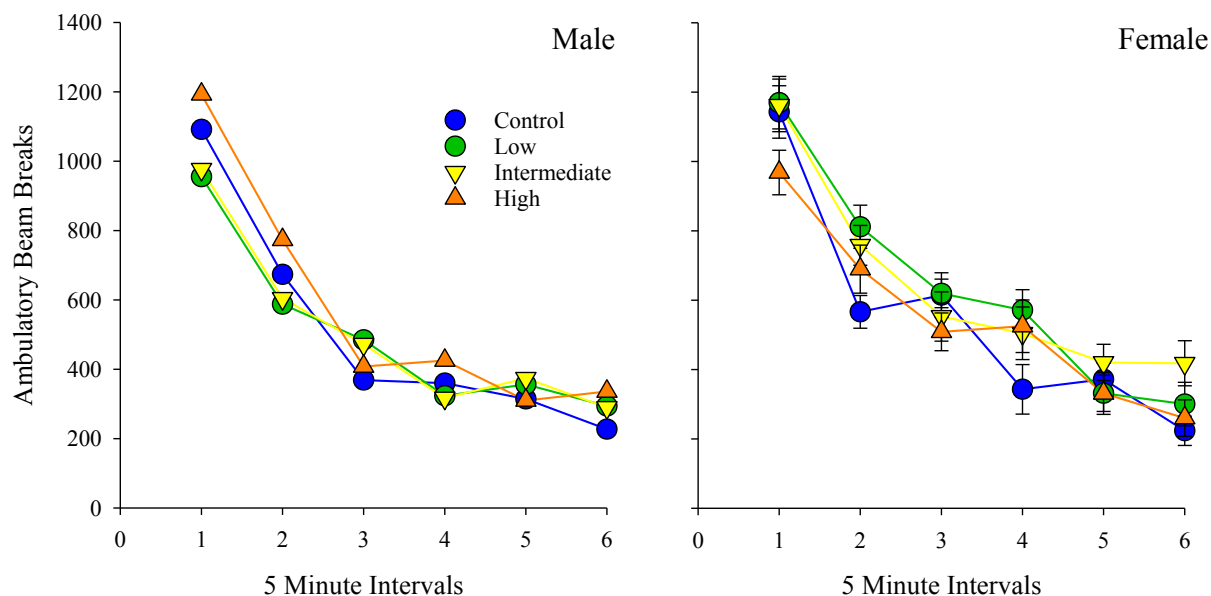
Neurobehavioral Assay	Control Group 0 mg/m <sup>3</sup>	Low Group 20 mg/m <sup>3</sup>	Intermediate Group 100 mg/m <sup>3</sup>	High Group 300 mg/m <sup>3</sup>
<b>Motor Activity</b>				
<b>Total Distance (cm)</b>	1605 ± 115	1838 ± 95	1867 ± 97	1596 ± 110
<b>Total Activity (seconds)</b>	873 ± 41	1015 ± 43	1016 ± 38	854 ± 41
<b>Average Speed (cm/second)</b>	2.822 ± 0.123	2.844 ± 0.087	2.903 ± 0.094	2.828 ± 0.105
<b>Time in Center vs. Perimeter (%)</b>	36.7 ± 2.6	41.6 ± 2.7	42.7 ± 1.8	39.5 ± 1.9
<b>Stereotypical Activity (beam breaks)</b>	296.0 ± 12.7	264.9 ± 11.1	283.6 ± 9.8	299.6 ± 13.0
<b>Total Ambulatory (beam breaks)</b>	3262 ± 214	3804 ± 199	3816 ± 182	3283 ± 211
<b>Vertical Rears (beam breaks)</b>	92.7 ± 10.8	129.9 ± 25.0	109.8 ± 16.7	96.4 ± 20.8
<b>FOB</b>				
<b>Forelimb Grip Strength (kg)</b>	0.325 ± 0.019	0.298 ± 0.024	0.297 ± 0.015	0.265 ± 0.012
<b>Hindlimb Grip Strength (kg)</b>	0.167 ± 0.009	0.155 ± 0.010	0.155 ± 0.007	0.147 ± 0.010

Note: Values are mean ± SEM (n=10)

**5.2.1 Motor Activity.** Male results for measures of general activity levels (distance, speed, time active, stereotypical, and ambulatory movements) showed no significant differences between control and the low, intermediate and high exposure groups (Table 23). Similarly, for measures of exploration (time in center, vertical rears), no significant differences were found between the controls and the low, intermediate and high exposure groups. Figure 10 (left) shows the total habituation of activity (beam breaks) for the males during a 30 minute run of six blocks of 5 minutes each. There was an expected main effect for block of time with decreased activity over the 30 minutes. There was no significant main effect for group or significant interaction for group over time.

Female results for measures of general activity levels (distance, speed, time active, stereotypical and ambulatory movements) or measures of exploration (time in center, vertical rears) showed no significant differences between control and the low, intermediate, and high exposure groups (Table 24). Figure 10 (right) shows the total habituation of activity (beam breaks) for the females during a 30 minute run of six blocks of 5 minutes each. There was an expected main effect for block of time with decreased activity over the 30 minutes. However, there was a significant ( $p < 0.05$ ) main effect at the second 5-minute time block where the controls were less active than both low and intermediate exposure groups but not statistically different from high

exposure group. This difference between the controls and exposed groups were not evident at other time intervals. Overall, there was no significant interaction for exposure group over time for the 30 minutes as a whole.

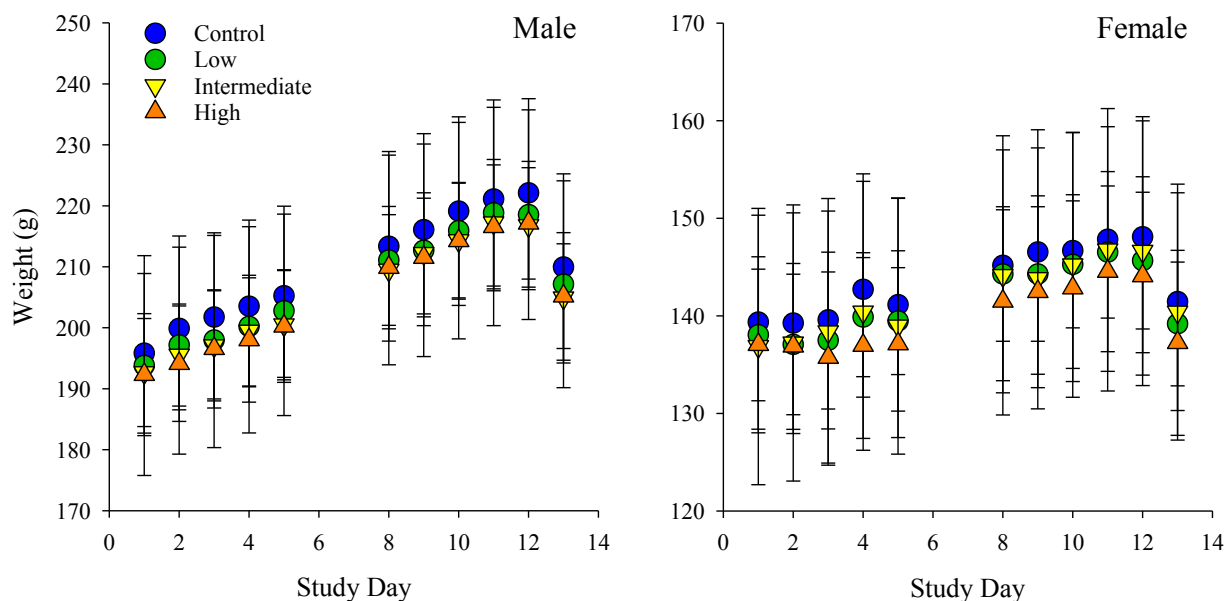


**Figure 10. Habituation over Time in Motor Activity Assay.** Male and female rat behavior in exposed animals was not different from their respective controls in a biologically significant manner.

**5.2.2 FOB.** For all functional observations including cage side, open field and manipulation tests, no exposure group-related effects were reported for either the exposed male or female rats. Chi-square statistics for proportion of various observations between exposure groups were not significant. Results for forelimb and hindlimb grip strengths are shown in Tables 23 and 24.

### 5.3 Body Weight

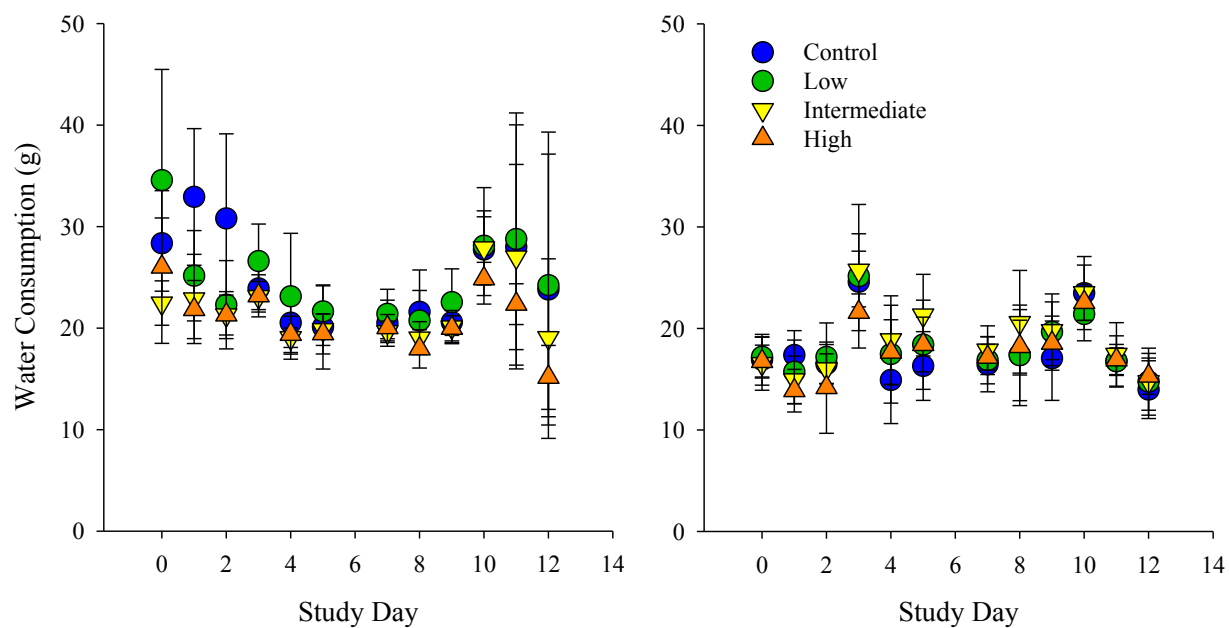
An analysis of variance of the male and female body weights on the final acclimation day pre-exposure did not show a significant difference between exposure group mean weights. Animals were weighed before each exposure, and when analyzed statistically, there was no significant difference in group mean body weights when compared on the same day. Animals generally gained weight throughout the exposure regimen (Figure 11). Animals were necropsied on the day following the last exposure and neurobehavioral tests. Animals were fasted after approximately 8 to 10 pm of the evening prior to necropsy and show corresponding weight loss at the final weighing. Complete body weight data can be found in Appendix K.



**Figure 11. Body Weights during Two-Week Inhalation Study.** Male and female rat weights were not different between groups. Final body weights decreased sharply due to fasting prior to necropsy.

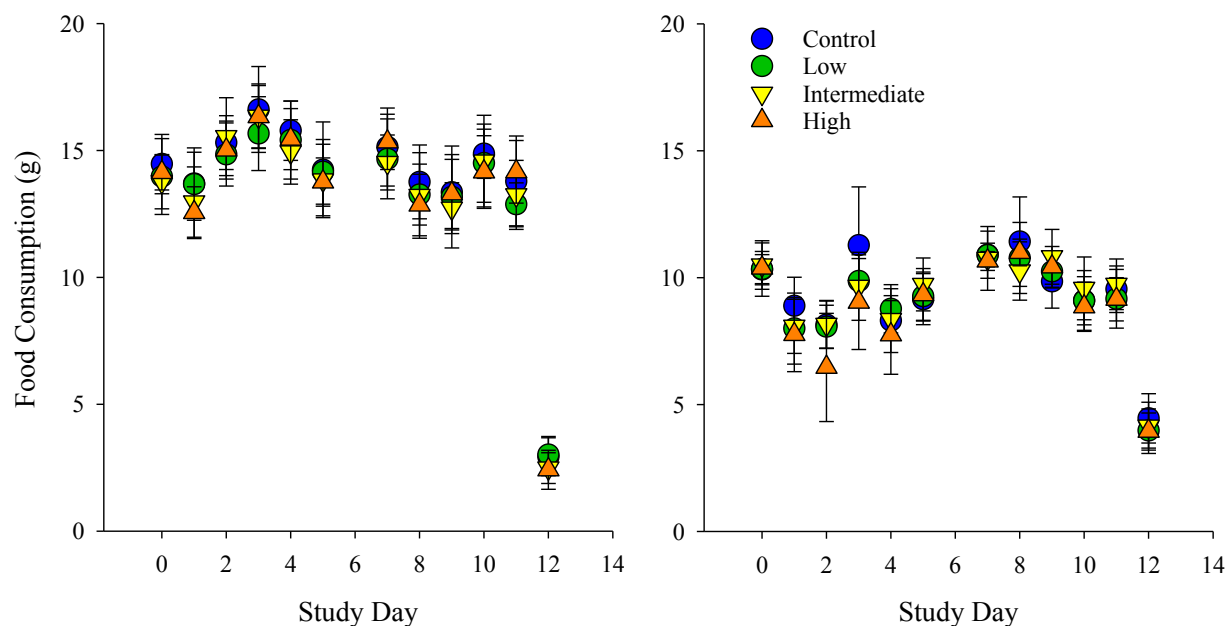
#### 5.4 Food and Water Consumption

In general, there was no statistically significant difference among exposure groups for water and food consumed in the same daily period (Figures 12 and 13). There was a pattern in food and water consumption most noticeable in female water consumption (Figure 12 bottom) and male food consumption (Figure 13 top), both of which indicate an increase on days 3 and 10. This was not a dose-related phenomenon and is most likely linked to an environmental factor; the rats were placed into newly cleaned domiciliary housing on the same day every week (days 3 and 10) during this study. Complete consumption data can be found in Appendix K.



**Figure 12. Average Daily Water Consumption during Two-Week Study.** Water consumption in male (left) and female (right) rats did not differ significantly between respective groups.





**Figure 13. Average Daily Food Consumption during Two-Week Study.** Consumption in male (left) and female (right) rats did not differ between respective exposure groups. Final day food consumption dropped sharply as the animals were fasted overnight prior to necropsy.

## 5.5 Organ Weights

Relative organ weight ratios at necropsy are found in Table 25. For consistency with Section 4.5, organ to body weight and organ to brain weight ratios are compared. Appendix L contains individual weights at necropsy and organ weight statistics. No statistically significant effects on organ weights were found between exposure groups in the two-week study. Female rats in the intermediate exposure group were found to have a significantly higher left kidney to brain weight ratio; this was considered an aberration and not an effect of exposure to PAO.

**Table 25. Two-Week Study Relative Organ Weight Comparisons in Male and Female Rats**

Male Rats					Female Rats			
Control	20 mg/m <sup>3</sup>	100 mg/m <sup>3</sup>	300 mg/m <sup>3</sup>		Control	20 mg/m <sup>3</sup>	100 mg/m <sup>3</sup>	300 mg/m <sup>3</sup>
<b>Tissue: Body Weight Ratios</b>								
<b>Brain:</b>	0.00860	0.00870	0.00880	0.00881		0.01209	0.01220	0.01210
<b>BW</b>	(0.00046)	(0.00060)	(0.00045)	(0.00026)		(0.00077)	(0.00054)	(0.00077)
<b>L. Kidney:</b>	0.00374	0.00374	0.00377	0.00370		0.00384	0.00390	0.00393
<b>BW</b>	(0.00022)	(0.00024)	(0.00022)	(0.00017)		(0.00021)	(0.00018)	(0.00021)
<b>R. Kidney:</b>	0.00366	0.00370	0.00369	0.00373		0.00383	0.00377	0.00384
<b>BW</b>	(0.00031)	(0.00027)	(0.00026)	(0.00016)		(0.00023)	(0.00013)	(0.00018)
<b>Adrenals:</b>	0.00023	0.00023	0.00023	0.00024		0.00038	0.00036	0.00037
<b>BW</b>	(0.00003)	(0.00002)	(0.00004)	(0.00004)		(0.00004)	(0.00004)	(0.00005)
<b>Liver:</b>	0.03343	0.03402	0.03411	0.03358		0.03060	0.03096	0.03163
<b>BW</b>	(0.00264)	(0.00244)	(0.00288)	(0.00275)		(0.00206)	(0.00245)	(0.00276)
<b>Tissue: Brain Weight Ratios</b>								
<b>L. Kidney:</b>	0.435	0.430	0.430	0.421		0.318	0.320	<b>0.325<sup>III</sup></b>
<b>Brain</b>	(0.021)	(0.031)	(0.032)	(0.018)		(0.022)	(0.014)	<b>(0.013)</b>
<b>R. Kidney:</b>	0.427	0.425	0.420	0.424		0.318	0.309	0.318
<b>Brain</b>	(0.036)	(0.030)	(0.036)	(0.017)		(0.032)	(0.016)	(0.015)
<b>Adrenals:</b>	0.027	0.027	0.027	0.027		0.031	0.029	0.031
<b>Brain</b>	(0.004)	(0.003)	(0.005)	(0.005)		(0.004)	(0.004)	(0.004)
<b>Liver:</b>	3.890	3.934	3.885	3.815		2.540	2.541	2.619
<b>Brain</b>	(0.292)	(0.494)	(0.356)	(0.299)		(0.231)	(0.220)	(0.222)

**Note:** <sup>III</sup>Statistically significant difference between the intermediate and high exposure group values ( $p \leq 0.05$ , not different from control value)

## 5.6 Clinical Chemistry and Histopathology

Clinical chemistry parameters were measured in blood samples taken at necropsy. There were no exposure group-related differences in any of the measured clinical chemistry parameters in males (Table 26) or females (Table 27) with one exception. The aspartate aminotransferase (AST) levels among the females exposed at the lowest concentration were significantly higher than controls. No elevation of AST was seen in the intermediate or high concentration exposed females; no dose-response effect is evident.

**Table 26. Clinical Chemistry Results in Two-Week Inhalation Study Male Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (20 mg/m <sup>3</sup> )		Intermediate (100 mg/m <sup>3</sup> )		High (300 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Albumin (g/dL)	3.31	0.64	3.42	0.48	3.49	0.53	3.14	0.33
Alkaline phosphatase (U/L)	203.8	52.4	195.9	48.2	185.0	34.1	186.5	32.1
Alanine transaminase (U/L)	66.9	12.5	77.4	22.8	74.4	16.4	70.1	13.2
Aspartate aminotransferase (U/L)	135.3	33.5	153.8	49.0	165.6	43.6	130.8	37.4
Blood urea nitrogen (mg/dL)	19.9	3.3	19.2	4.5	19.8	1.8	21.2	1.5
Cholesterol (mg/dL)	61.2	9.2	61.7	7.8	65.0	9.0	57.1	6.5
Creatine kinase (U/L)	646.0	138.0	875.4	349.2	898.7	362.2	765.2	196.2
Creatinine (mg/dL)	0.48	0.11	0.42	0.10	0.45	0.15	0.44	0.08
Globulins (g/dL)	2.69	0.41	2.33	0.47	2.30	0.56	2.43	0.35
Glucose (mg/dL)	178.6	20.8	161.6	22.5	178.9	24.7	168.4	19.2
Total bilirubin (mg/dL)	0.30	0.15	0.28	0.30	0.26	0.11	0.15	0.05
Total protein (g/dL)	5.98	0.41	5.77	0.21	5.79	0.76	5.58	0.39
Triglycerides (mg/dL)	82.9	32.0	79.7	36.5	89.3	38.0	75.6	29.3
Na <sup>+</sup> (Sodium, mmol/L)	151.3	5.5	150.2	11.1	153.7	8.5	155.9	16.6
K <sup>+</sup> (Potassium, mmol/L)	5.21	0.41	5.17	0.89	5.73	1.01	5.40	0.54
Cl <sup>-</sup> (Chloride, mmol/L)	102.7	3.0	102.6	4.6	105.1	3.6	106.8	8.0

Notes: dL: deciliter; SD: standard deviation; U: international unit

**Table 27. Clinical Chemistry Results in Two-Week Inhalation Study Female Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (20 mg/m <sup>3</sup> )		Intermediate (100 mg/m <sup>3</sup> )		High (300 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Albumin (g/dL)	2.93	0.26	3.04	0.38	3.10	0.42	2.86	0.33
Alkaline phosphatase (U/L)	128.9	29.4	113.6	23.6	149.1	41.9	126.6	21.3
Alanine transaminase (U/L)	51.2	5.59	53.9	16.55	55.9	13.65	61.3	8.96
Aspartate aminotransferase (U/L)	122.5	41.5	<b>219.4*</b>	94.8	131.1	40.9	156.4	55.3
Blood urea nitrogen (mg/dL)	18.0	2.36	20.3	2.69	18.6	3.34	20.0	1.66
Cholesterol (mg/dL)	88.0	9.15	83.0	7.94	89.3	9.36	84.0	7.33
Creatine kinase (U/L)	805.9	491.9	1190.0	435.5	741.0	312.7	833.8	190.7
Creatinine (mg/dL)	0.31	0.09	0.30	0.07	0.32	0.09	0.33	0.07
Globulins (g/dL)	2.67	0.46	2.68	0.18	2.64	0.31	2.50	0.26
Glucose (mg/dL)	141.7	19.3	147.9	17.2	146.4	15.8	129.7	16.1
Total bilirubin (mg/dL)	0.31	0.23	0.53	0.49	0.33	0.13	0.29	0.13
Total protein (g/dL)	5.61	0.35	5.71	0.38	5.76	0.42	5.34	0.32
Triglycerides (mg/dL)	31.3	7.7	32.7	6.5	30.0	7.8	27.9	7.0
Na <sup>+</sup> (Sodium, mmol/L)	148.4	10.0	146.4	3.6	153.1	9.9	154.1	9.4
K <sup>+</sup> (Potassium, mmol/L)	4.92	0.50	4.98	0.19	4.99	0.32	5.32	0.75
Cl <sup>-</sup> (Chloride, mmol/L)	103.4	5.8	103.8	2.6	105.8	4.8	107.1	3.5

Notes: \*Different from controls (p<0.05); dL: deciliter; SD: standard deviation; U: international unit

Hematology parameters were measured in blood samples taken at necropsy. Some statistically significant changes were noted. Male rats showed a dose-dependent increase in percent neutrophils (Table 28). A significant increase in mean platelet volume occurred in the intermediate group male rats. Neither the low or high exposure group male values were different from control values.

Female rats also showed sporadic but significant changes in mean platelet volume, number of platelets, and total white blood cell counts (due to decreased lymphocyte counts). These changes were not dose-dependent. Statistically significant dose-dependent increases in percent neutrophils and decreases in percent lymphocytes were also observed (Table 29). Complete clinical chemistry and hematology results are found in Appendix M.

**Table 28. Hematology Results in Two-Week Inhalation Study Male Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (20 mg/m <sup>3</sup> )		Intermediate (100 mg/m <sup>3</sup> )		High (300 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
White blood cells (# x 10 <sup>3</sup> /μL)	4.42	2.22	4.10	1.51	5.55	1.83	5.32	2.15
Neutrophils (# x 10 <sup>3</sup> /μL)	0.90	0.55	0.81	0.33	1.38	0.69	1.35	0.68
Lymphocytes (# x 10 <sup>3</sup> /μL)	3.20	1.54	3.03	1.12	3.75	1.06	3.63	1.33
Monocytes (# x 10 <sup>3</sup> /μL)	0.29	0.20	0.24	0.12	0.36	0.17	0.31	0.23
Eosinophils (# x 10 <sup>3</sup> /μL)	0.02	0.03	0.01	0.01	0.04	0.08	0.02	0.02
Basophils (# x 10 <sup>3</sup> /μL)	0.01	0.02	0.00	0.00	0.02	0.05	0.01	0.02
Neutrophils (%)	18.50	5.28	19.68	2.42	<b>23.57*</b>	6.23	<b>24.10*</b>	7.22
Lymphocytes (%)	74.74	7.13	74.04	4.04	69.13	7.75	70.23	9.30
Monocytes (%)	6.08	2.52	5.88	1.91	6.36	2.41	5.08	2.47
Eosinophils (%)	0.41	0.64	0.32	0.37	0.58	1.11	0.40	0.43
Basophils (%)	0.28	0.37	0.08	0.09	0.36	0.68	0.20	0.32
Red blood cells (# x 10 <sup>6</sup> /μL)	8.36	1.89	9.09	0.68	9.32	0.44	8.77	1.39
Hemoglobin (g/dL)	13.83	3.40	15.11	1.28	15.58	0.70	14.71	2.39
Hematocrit (%)	45.24	10.37	49.41	3.81	50.96	3.21	47.74	7.31
Mean corpuscular volume (fL)	54.12	1.30	54.38	0.66	54.69	2.01	54.54	0.94
Mean corpuscular hemoglobin (pg)	16.44	0.67	16.62	0.53	16.73	0.45	16.76	0.45
Mean corpuscular hemoglobin concentration (g/dL)	30.38	1.31	30.60	1.00	30.63	1.25	30.74	1.11
Red blood cell distribution width (%)	17.03	0.94	17.27	0.52	17.31	0.72	16.90	0.61
Platelets (# x 10 <sup>3</sup> /μL)	613	292	437	351	349	338	674	335
Mean Platelet Volume (fL)	6.75	1.17	7.64	1.58	<b>8.41*</b>	1.70	7.06	1.77

Notes: \*Different from control (p<0.05); dL: deciliter; fL: femtoliter; pg: pictogram; SD: standard deviation

**Table 29. Hematology Results in Two-Week Inhalation Study Female Rats**

Exposure Group	Control (0 mg/m <sup>3</sup> )		Low (20 mg/m <sup>3</sup> )		Intermediate (100 mg/m <sup>3</sup> )		High (300 mg/m <sup>3</sup> )	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
White blood cells (# x 10 <sup>3</sup> /μL)	4.98	1.66	4.36	2.10	<b>3.74*</b>	0.64	5.31	1.50
Neutrophils (# x 10 <sup>3</sup> /μL)	0.72	0.32	0.74	0.43	0.68	0.17	1.06	0.37
Lymphocytes (# x 10 <sup>3</sup> /μL)	4.04	1.37	3.40	1.54	<b>2.85*</b>	0.45	4.02	1.13
Monocytes (# x 10 <sup>3</sup> /μL)	0.21	0.11	0.21	0.18	0.19	0.11	0.21	0.10
Eosinophils (# x 10 <sup>3</sup> /μL)	0.012	0.010	0.009	0.013	0.011	0.019	0.012	0.015
Basophils (# x 10 <sup>3</sup> /μL)	0.005	0.007	0.006	0.011	0.007	0.013	0.007	0.010
Neutrophils (%)	14.16	4.12	<b>16.79*</b>	2.47	<b>17.94*</b>	3.09	<b>19.92*</b>	3.19
Lymphocytes (%)	81.18	4.49	78.66	3.77	<b>76.78*</b>	4.76	<b>75.85*</b>	3.79
Monocytes (%)	4.34	1.78	4.12	2.17	4.87	2.57	3.83	1.82
Eosinophils (%)	0.219	0.178	0.248	0.380	0.257	0.363	0.246	0.234
Basophils (%)	0.091	0.103	0.178	0.371	0.153	0.259	0.155	0.166
Red blood cells (# x 10 <sup>6</sup> /μL)	9.02	0.43	8.96	0.55	9.02	0.41	9.31	0.47
Hemoglobin (g/dL)	15.02	0.48	14.80	1.12	14.84	0.75	15.40	0.76
Hematocrit (%)	51.58	2.66	51.62	3.36	51.41	2.46	52.89	2.93
Mean corpuscular volume (fL)	57.19	0.58	57.59	1.10	57.03	1.22	56.83	0.56
Mean corpuscular hemoglobin (pg)	16.67	0.53	16.49	0.49	16.47	0.48	16.55	0.43
Mean corpuscular hemoglobin concentration (g/dL)	29.14	1.02	28.67	0.97	28.88	0.99	29.15	0.81
Red blood cell distribution width (%)	15.86	0.57	15.94	0.67	15.86	0.57	16.10	0.54
Platelets (# x 10 <sup>3</sup> /μL)	535	307	<b>255*</b>	293	629	276	419	255
Mean Platelet Volume (fL)	6.46	1.94	<b>8.16*</b>	1.84	6.46	1.03	6.63	2.16

Notes: \*Different from control (p<0.05); dL: deciliter; fL: femtoliter; pg: picogram; SD: standard deviation

## 5.7 Histopathology

The incidence and severity of effects for nasal cavity sections (NL3 and NL4) and lungs are shown in Table 30 and Figure 14. The description of effects are described below. No effects were seen in the first (NL1), second (NL2) and third (NL3) sections of the nasal cavities and are therefore not discussed below. To remain consistent with Section 4.7, NL1 and NL2 are not shown in Table 30. Complete histopathology tissue review results are found in Appendix N.

**Table 30. Incidence and Severity Ratings for Tissue Sections from Rats Exposed to PAO Aerosol in Two-Week Inhalation Study**

Tissue Section	Control (0 mg/m <sup>3</sup> )	Low (20 mg/m <sup>3</sup> )	Intermediate (100 mg/m <sup>3</sup> )	High (300 mg/m <sup>3</sup> )
<b>Incidence</b>				
NL3	0	0	0	0
NL4	0	0	0	12/20 (60%)
Lung	0	0	1/20 (5%)	19/20 (95%)
<b>Severity</b>				
NL3	0	0	0	0
NL4	0	0	0	0.71 ± 0.13
Lung	0	0	0.05 ± 0.05	1.25 ± 0.12

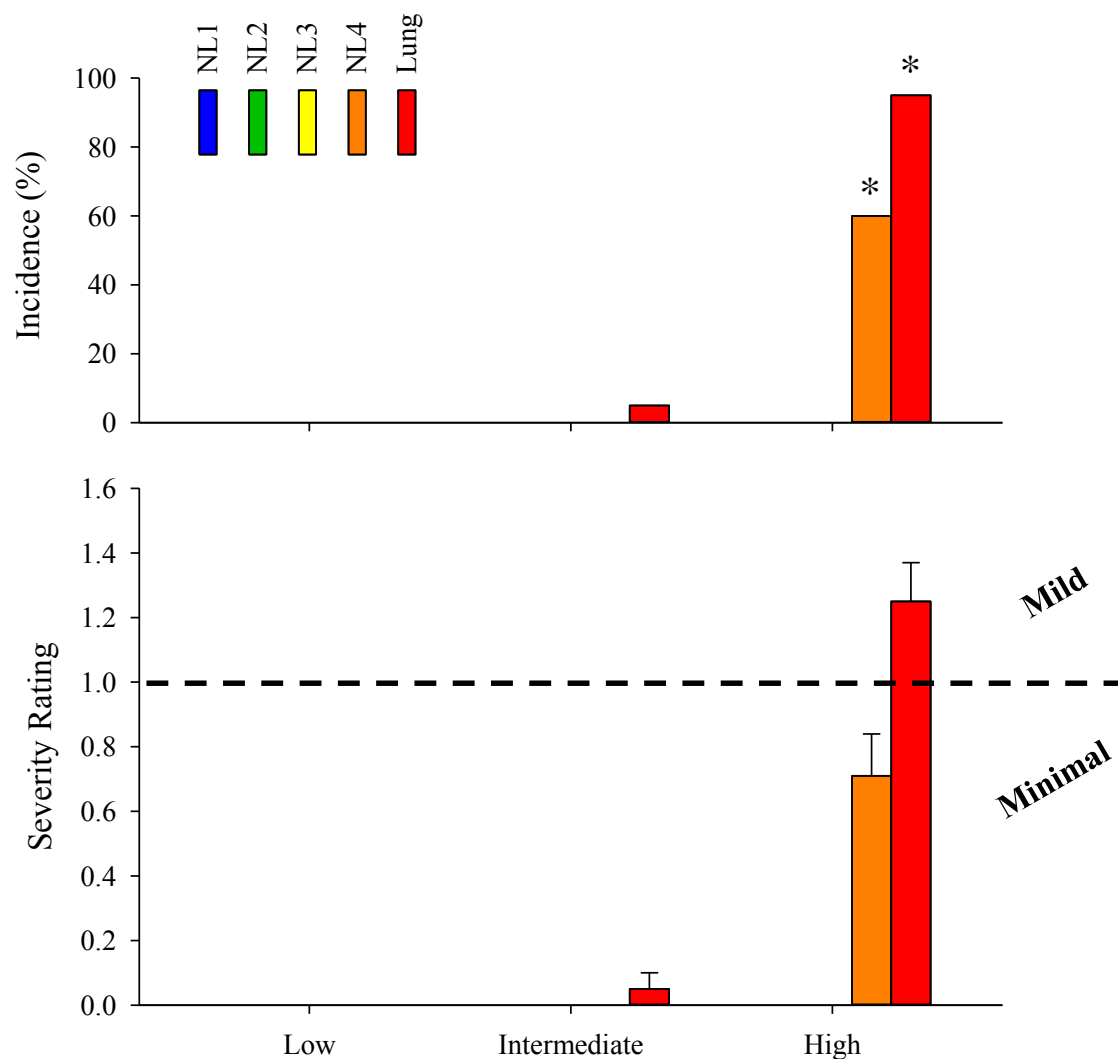
Notes: Nasal Level (NL) 1 and 2 had no incidence of lesions and are not shown in the table. Incidence units = number of rats with effects/n (% number of rats with effects); Severity units = mean ± standard error of the mean; Severity ratings: 0 = Normal, 1 = Minimal/Rare, 2 = Mild, 3 = Moderate, 4 = Marked, 5 = Severe

**5.7.1 Intermediate Exposure Group.** In the intermediate exposure group after two weeks of exposure to PAO, only one rat had an effect; the tissues of 19 rats were normal. In the single rat, a peri-mortem focal area of hemorrhage was found in a lung. As this lesion was not seen in any of the other lungs in the two-week study and that this lesion can be induced during euthanasia, it was considered unrelated to the PAO exposure.

**5.7.2 High Exposure Group - Nasal Cavities.** The NL4 section in high exposure group rats was the only nasal cavity region to have an effect due to exposure to PAO (Figure 15). Lesions occurred in 12 out of 20 rats (60 percent incidences) with a mean severity score of 0.71 (minimal). Five out of 12 rats displayed minimal multifocal neutrophilic inflammation with loss of epithelium and necrotic debris. Four of the 12 showed minimal multifocal neutrophilic inflammation, but one also had necrotic debris, one had single cell necrosis, one had loss of epithelium, and one had simple inflammation. Two of the remaining three rats of 12 affected showed a single minimal multifocal effect, one with necrotic debris and one with loss of epithelium. Only a single rat had mild multifocal loss of epithelium with edema.

**5.7.3 High Exposure Group – Lungs.** In the lungs of the high exposure group rats, the overall occurrence of lesions was 95 percent as a single rat out of 20 had normal lungs. The overall severity was 1.25 as six rats had a score of mild (severity = 2) while the other 13 a minimal effect (severity = 1). All of the effects were multifocal with the primary lesion being mild or

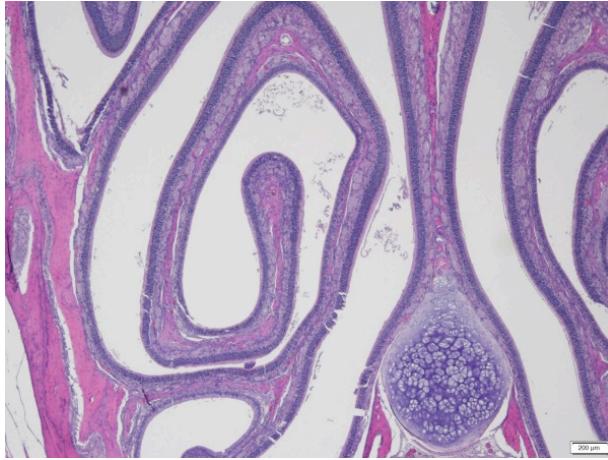
minimal mixed minimal neutrophilic and mononuclear inflammation in 16 of the 19 rats (Figure 16). One rat showed minimal neutrophilic inflammation without other findings. Two rats exhibited mild mixed neutrophilic and mononuclear inflammation with necrotic debris and single cell death.



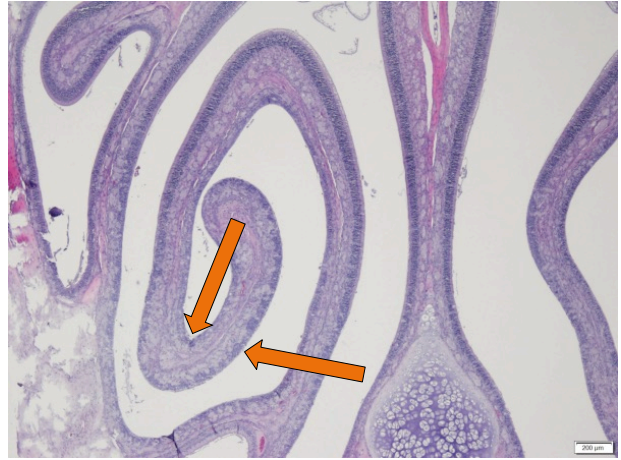
**Figure 14. Histopathological Incidence and Significance of Regional Nasal Tissues and Lung for Male and Female Rats Combined.** Severity ranking is noted at the right of the graph. The drawings in Figure 5 indicates the nasal cavity tissue section (NL1 through NL4) or lung tissue by color. No effects were seen in NL1, NL2 or NL3. Significance markings indicate that exposure group and incidence are related (\* $p < 0.001$ ).



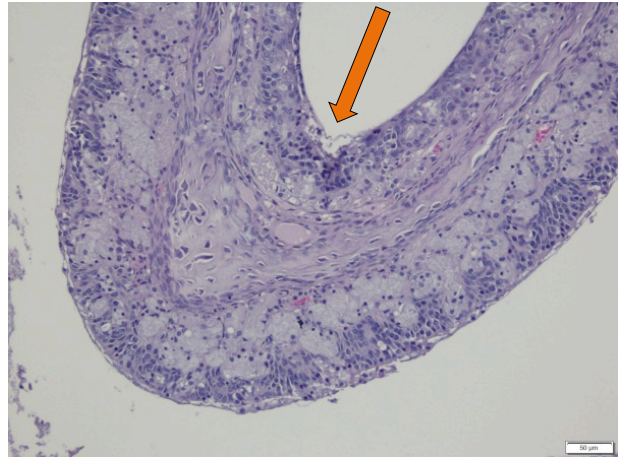
**Control (40X)**



**High Exposure Group (40X)**

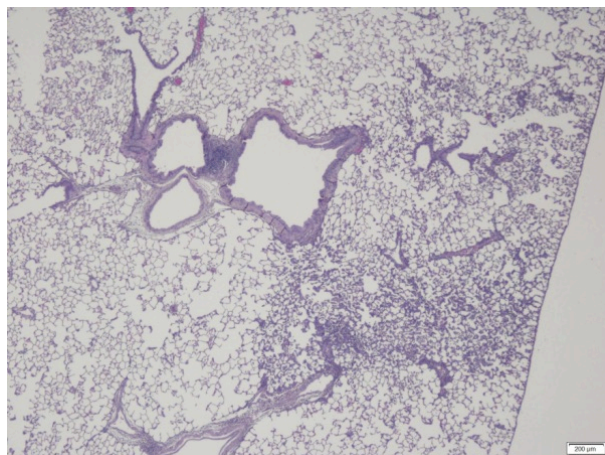


**High Exposure Group (200X)**

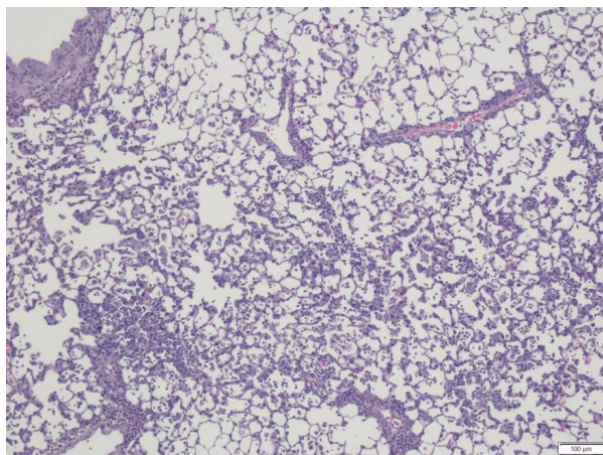


**Figure 15. Nasal Cavity NL4 Tissues.** Arrows indicate focal points of inflammation.

### High Exposure Group (40X)



### High Exposure Group (100X)



**Figure 16. Lung Tissue Lesions from 300 mg/m<sup>3</sup> Exposure Group.** The photos depict occasional alveolar septa expanded by inflammatory cells and alveoli containing neutrophils, macrophages, scant fibrin and necrotic debris.

## 6.0 DISCUSSION AND CONCLUSIONS

### 6.1 Acute Study Discussion

The acute PAO inhalation study successfully served as a pilot study and range finder for the two-week study. The male and female Fischer 344 rats were exposed in five replicates for their single six-hour acute exposures to the PAO fluid aerosol. The exposures in each replicate were uniform. Each replicate concentration fell within 2.5 percent of the study average concentration and the study average concentrations for each exposure level were within 2 percent of the target concentration. Particle size distribution measurements of the exposure atmospheres showed that the PAO aerosol was respirable, and generally uniform from among the exposures.

The neurobehavioral tests conducted immediately following the acute exposure showed that rats, both males and females, appeared to be more passive after exposure to the high concentration PAO, and to a lesser extent the intermediate concentration PAO. The handling test of the FOB and the total distance traveled and ambulatory beam breaks measurements of the motor activity provided evidence of increased passivity. These effects were not observed in the animals held for 14 days post-exposure.

Body weight data were analyzed using the exposure event as the reference time point. The weight ratio of the first post-exposure day weight divided by the exposure day weight showed a dose-response in severity. The largest weight ratio decrease was seen in the high concentration exposure group for both the acute and recovery cohorts; this change was significant in both males and females (8 and 10 percent, respectively). A smaller change for the intermediate group of both cohorts was also seen in both males and females but was statistically significant only in

females. This clear dose-dependent effect on body weight at high concentrations of PAO fluid aerosol did not persist in the recovery cohort. All recovery cohort animals lost a comparable proportion of weight on the necropsy day due to overnight fasting in preparation for this procedure.

In order to determine whether this body weight effect was related to food or water consumption, the amount of food or water consumed relative to the day of exposure was calculated. Concurrent with weight loss, food and water consumption was significantly reduced in the groups of animals that lost weight. Animals in the high- and intermediate-concentration exposure groups ate less and drank less during the time period immediately following exposure to PAO. On the following day, the consumption rates for food and water appeared to go back to normal. Exposure to PAO may have made food and water temporarily unpalatable, resulting in lower consumption. Alternatively, the food and water consumption may be linked to the neurobehavioral observations that the high and intermediate concentration exposed animals were more passive in both the FOB and motor activity tests. Thus, animals may have eaten and drank less because they were sedated or otherwise less inclined to move. The effect of the exposure at high and intermediate PAO concentration was to decrease the food and water intake, leading to the decreased weight gain. Those effects diminished after a day, and the animals' food and water consumption appeared to return to normal two days after exposure.

Relative organ weight ratios for the acute cohort were also affected by the decreased food and water intake. Organ to body weight and organ to brain weight ratios were not different in the exposed groups as compared to the control group among the recovery cohort, indicating that this effect is secondary to the body weight effect discussed above.

Clinical chemistry and hematology results did not show trends related to a biological response due to inhalation of PAO. The number of basophils in the high concentration exposure group of males was low compared with control values. A dose-response trend is not clear due to the very low number of basophils observed. The percent basophils metric indicates that a dose-response may be seen in the data. However, this is confounded by the fact that all of these values fall within historical data from healthy control animals of similar age (Charles River Laboratories International, Inc., 2012). Therefore there is probably no biological significance to this finding.

The acute exposure of rats to the PAO at the levels in this study led to animals that were more passive and explored less than controls or rats in lower exposure groups. In turn, the animals exposed to the highest PAO concentration (1000 mg/m<sup>3</sup>) ate and drank less and had significantly lower weight gain during the 24-hour period following exposure. Those effects appeared to diminish by the next day, when food and water consumption returned to the same levels as controls.

All three exposure groups of PAO caused effects in the nasal cavities and lungs of male and female rats exposed to the PAO aerosol. No effects were seen in the most anterior sections (NL1 and NL2) of the nasal cavities. Effects included degeneration and necrosis indicating cell death due to the acute aerosol exposure. The incidence and severity of the cellular toxicity increased in a dose-response manner progressing to inflammation that was seen in multiple areas of the nasal cavities and lungs. In the NL4 section of the nasal cavities the cellular changes appeared to peak

at the intermediate exposure concentration and remain relatively the same for the high exposure group.

In the lungs, there was an observed result leading to suggestion of increased severity from the intermediate to the high exposure, but the increase was due to just one rat with a higher severity score. Although recovery was occurring in all of the nasal cavities and lungs affected, it was not 100 percent after two weeks. However, in the low exposure group (both impacted tissues) and the intermediate exposure group NL3 tissue, recovery was not 100 percent due to effects remaining in one rat. The intermediate and high exposure group NL4 nasal cavity sections and the lungs had the slowest recovery, with only 42 to 80 percent recovery as evaluated by incidence; however, recovery was reduced to minimal effects as evaluated by severity rating. Acute exposure to PAO aerosol for six hours caused significant toxicity in the nasal cavities and lungs of male and female rats. Dose-dependent recovery occurred, but it was not 100 percent after two weeks.

The effects seen in the acute study allowed appropriate exposure concentrations to be set for the two-week study. Because of the neurological effects at the high and intermediate concentrations, target concentrations for the two week/ten day exposure were reduced to 20, 100, and 300 mg/m<sup>3</sup> PAO.

## **6.2 Two-Week Study Discussion**

Two-week study target concentrations were set to provide a similar exposure on a cumulative concentration multiplied by time basis. Male and Female Fischer 344 rats were exposed to the PAO fluid aerosol for six hours per day, five days per week over two weeks for a total of ten exposure days. The intermediate exposure concentration of 100 mg/m<sup>3</sup> for the two-week study was set such that five days of exposure would match one day of exposure at 500 mg/m<sup>3</sup> in the acute exposure, and 10 days of exposure would match one day of exposure at 1000 mg/m<sup>3</sup> for the high concentration in the acute exposure. Also, five days of exposure at 300 mg/m<sup>3</sup> at the high concentration for the two week study would exceed one day of exposure at 1000 mg/m<sup>3</sup> in the acute study. The low concentration target of 20 mg/m<sup>3</sup> for the two week study over five days would match the single day low concentration of 100 mg/m<sup>3</sup> for the acute study.

Animals were exposed in two replicates in order to accommodate neurobehavioral testing at the end of the exposure regimen. Particle size distribution measurements of the exposure atmospheres showed that the PAO aerosol was respirable, and generally uniform among the exposures. The aerosol concentration measurements demonstrated that the exposure concentration was uniform among the exposures and that the measured concentration was within two percent of the target concentration. Therefore, there were no notable differences in the exposure atmosphere among the two replicate exposures.

The neurobehavioral tests showed no significant effects in either male or female rats after the last two days of exposure. The body weights of the animals did not show any exposure-related effects. Food and water consumption did not show any exposure-related effects, nor did the relative organ weights at necropsy. This contrasts with neurobehavioral effects, body weight

loss, and altered organ to body weight and organ to brain weight ratios seen after a single acute exposure to high concentrations of PAO fluid aerosol.

The two-week inhalation study results with PAO fluid aerosol indicated that the substantial neurobehavioral and weight loss effects seen immediately following the acute study are not observed with repeated exposures at lower concentrations. The highest exposure group in this study, 300 mg/m<sup>3</sup>, then serves as the no observed adverse effect level for neurobehavioral changes.

Clinical chemistry results did not show any trends that are indicators of a significant biological response due to inhalation of PAO fluid aerosol. Hematology results, however, were not as clearly interpretable (Tables 28 and 29). Male rats showed a dose-dependent increase in percent neutrophils; however, percentages for all exposure groups including controls were lower than the reference range (reference mean: 37.25 percent, range: 24.66 to 52.65 percent) published by the animal provider (Charles River Laboratories International, Inc., 2012). As the highest exposure group percent neutrophils number approaches the normal low, the increase is not considered biologically significant. Female rats also showed statistically significant dose-dependent increases in percent neutrophils and corresponding decreases in percent lymphocytes. Similar to the situation in males, the neutrophils in the control, low, and intermediate female rats were lower than the reference range (reference mean: 32.13 percent, range: 19.12 to 47.33 percent, Charles River Laboratories International, Inc., 2012). Only the increased high exposure group female percentages fell within the reference range. All groups of females had percent lymphocyte numbers higher than the reference range (reference mean: 59.13 percent, range: 41.61 to 74.18 percent, Charles River Laboratories International, Inc., 2012); the decreasing trend in this percentage approaches normal based on data from 210 rats of the same strain and supply. Although these trends are of questionable biological significance, they could also be considered evidence of a mild inflammatory response that complements the histopathological findings.

Histopathology results showed repeated dose effects in the NL4 sections of nasal cavities and lungs of the 300 mg/m<sup>3</sup> exposure group. In the 20 and 100 mg/m<sup>3</sup> exposure groups, there were no treatment related effects in any tissue examined, including the nasal and lung target tissues. The NL4 section of nasal cavities in the high exposure group had cell loss, necrosis and inflammation that were minimal in all but one rat (mild); incidence of lesions was only 60 percent overall. Based on the nasal results in the acute study, recovery would be expected in these rats following repeated exposures.

A single lung effect in the intermediate exposure group was identified as a peri-mortem focal hemorrhage; as this type of effect can be associated with euthanasia, it is not considered to be related to PAO exposure. In the high exposure group, all rats but one showed exposure-related effects. In the affected multifocal areas, alveolar septa were expanded by inflammatory cells and alveoli containing neutrophils, macrophages, scant fibrin and necrotic debris; these signs of inflammation are consistent with the hematology results discussed above. Again recovery is expected given the minimal to mild severity of these lesions seen in the lungs and based on the lung recovery results in the acute study. The respiratory no observable adverse effect

concentration (NOAEC) for the PAO aerosol would be 100 mg/m<sup>3</sup> for the purpose of OpEL calculation.

## **7.0 LITERATURE SUMMARY AND POTENTIAL OpEL**

### **7.1 Literature Summary**

Few studies have been published on the toxicity of PAO fluids. Although eye and skin irritation, dermal sensitization and acute lethality studies for both oral and inhalation routes have been performed on PAO fluids (Benda *et al.*, 1996; Kinkead *et al.*, 1992; MacEwen and Vernot, 1983; Mattie *et al.*, 1993), it is difficult to impossible to know how those fluids compare to the PAO fluids acceptable for use in modern aircraft. Studies performed by military laboratories (Kinkead *et al.*, 1992; MacEwen and Vernot, 1983; Mattie *et al.*, 1993) were not allowed to report on the proprietary composition of the fluids they tested. Although those fluids were designed to meet military specifications, the components of the fluids vary based on allowable content with the intent to meet a performance standard.

Even in well described fluids, there are apparent discrepancies between results that likely indicate fluid component differences. Benda *et al.* (1996) reports apparently previously unpublished data on 1-decene derived PAO fluids that ranged in kinematic viscosity from 2 to 10 centistokes (cSt, unit equivalent to mm<sup>2</sup>/second) at 100 °C. Skin and eye irritation plus skin sensitization assays are reported as negative. The 1-decene dimer PAO fluid in this study has a viscosity of 1.68 cSt, so it is less viscous than those fluids referenced above. According to Radco (see Appendix B), the PAO fluid used in this study causes eye and skin irritation. At this time, it is unclear if the less viscous fluid causes the irritation differences, or if the effects are related to proprietary additives.

### **7.2 Proposed Draft OpELs**

Military exposures to PAO fluids do not span eight hours a day for five days a week, as is assumed for a civilian industrial setting. Shorter term OpELs are needed to cover times that are more consistent with Air Force operations. Acute Exposure Guideline Level (AEGL) guidelines provide a potential way to propose OpELs for military exposures that are not expected to occur frequently. AEGLs are calculated for emergency exposure periods of 10 and 30 minutes and one, four, and eight hours. There are three AEGL levels based on the severity of response to a chemical. AEGL-1 is an airborne concentration of a substance to which the general public, including susceptible individuals, could experience “notable discomfort, irritation, or certain asymptomatic non-sensory effects [that] are not disabling and are transient and reversible upon cessation of exposure” (NRC, 2001). Only this first level (AEGL-1) applies to the tested PAO fluid due to the transient neurobehavioral effects and irritation based inhalation effects observed in the study herein.



Point of departure (POD) values required for AEGL type calculations were determined from study data using both the acute and two-week repeated exposure studies featured in this report. The POD can be determined using different methods; the preferred method is calculation of a benchmark concentration with dosimetric adjustments. When sufficient data do not exist for the benchmark method, the default method is to utilize the NOAEC as the POD (NRC, 2001).

**7.2.1 POD Utilizing Acute Study Data.** Benchmark concentration modeling was performed using Benchmark Dose Software (version 2.6.0.1, U.S. EPA, Research Triangle Park NC) with nasal lesion incidence data from the single six-hour exposure acute cohort. Effects associated with AEGL-1 concentrations of chemicals are transient but still produce notable levels of discomfort (NRC, 2001); for PAOs, the incidence of lesions in the nasal cavities (NL2, NL3, and NL4) graded as at least moderately severe was identified as the critical effect, which meets these requirements of adversity and transience.

The establishment of a benchmark concentration has several advantages over the traditional NOAEL approach, including less reliance on study design and a direct reflection of the exposure-response relationship. This method relies heavily on the nature of the data to which the models will be applied. After performing the calculations on the six-hour acute exposure data, it was determined that the dataset chosen for this approach is unsuitable for modeling. The standard dichotomous models included in the BMDS package did not display acceptable goodness-of-fit with no p-values above the recommended level of 0.1. The exception, the dichotomous Hill model, was invalidated by the absence of information between the extremes of control and maximum response (U.S. EPA, 2012). Thus, the default approach of using the six-hour NOAEL (100 mg/m<sup>3</sup> aerosol) as the POD is preferred when using this dataset.

**7.2.2 POD Utilizing Two-Week Study Data.** The default NOAEC POC approach was used to calculate OpELs for the two-week repeated exposure study. Repeated exposures up to 300 mg/m<sup>3</sup> did not result in neurobehavioral responses and exposure-related respiratory irritation was not seen in the 100 mg/m<sup>3</sup> group. Therefore, 100 mg PAO/m<sup>3</sup> aerosol is the proposed POD for the two-week study to protect from both neurobehavioral and respiratory adverse outcomes.

**7.2.3 OpELs Calculated Using AEGL Guidance.** Dosimetric adjustments were performed using the Multi-Path Particle Dosimetry (MPPD) Model (v 3.04; Applied Research Associates, Inc., Albuquerque NM). Human fractional deposition was calculated using the Yeh and Schum model, and rat fractional deposition was calculated using the semi-symmetric Long-Evans model. MMAD and GSD values were retrieved from Table 7 for the acute study. The fractional deposition and respiratory surface area output values were used in combination with minute values of 2 L per minute for rats (MPPD default) and 40 L per minute for humans (de Winter-Sorkina and Cassee, 2002) to calculate a regional deposited dose ratio, which became the POD for the AEGL calculation.

Using the 100 mg PAO/m<sup>3</sup> aerosol as a POD, MPPD software simulations indicated that deposition would occur primarily in the nasal cavities of rats and humans. A regional deposited

dose ratio of 0.23 was calculated by normalizing the ratio of animal to human fractional depositions to respiratory surface area and minute volume.

A composite uncertainty factor of 10 was chosen based on the use of an interspecies uncertainty factor of 1 and an intraspecies uncertainty factor of 10. Interspecies uncertainty was reduced to unity due to the use of dosimetric adjustments and the reasoning that the PAO irritation mode of action is unlikely to differ significantly between species. The intraspecies uncertainty factor was kept at 10 due to the lack of human data for PAO.

Therefore, when applying the uncertainty factors and dosimetric adjustments to the POD, a six-hour AEGL-1 value of  $2.3 \text{ mg/m}^3$  aerosol was calculated. Extrapolation to different exposure durations is based on the premise of  $(C^n \times t = k)$ , where C is concentration, t is time, k is the toxic load. The value of n can be assumed to equal one if the endpoint for the AEGL does not produce lethality and is reversible (NRC, 2001). A k value of  $828 \text{ mg-minutes/m}^3$  was calculated. The proposed values for eight-hour, four-hour, one-hour, 30-minute, and 10-minute AEGL-based OpELs are 1.7, 3.5, 14, 28, and  $28 \text{ mg/m}^3$  aerosol, respectively (Table 31). Per the NRC guidance, when extrapolating using four- to eight-hour values, the 10-minute AEGL-1 is assigned the same value as the 30-minute level. Therefore, the 10-minute value for this PAO aerosol is  $28 \text{ mg/m}^3$ .

**Table 31. Proposed OpEL Values for PAO Fluid Aerosol**

Time Point	Proposed OpEL (aerosol, $\text{mg/m}^3$ )
10 minutes	28
30 minutes	28
1 hour	14
4 hours	3.5
8 hours	1.7

### 7.3 Conclusion

Acute effects of the current PAO fluid aerosol are short-lived and recoverable. Short-term repeated exposure did not result in any cumulative effects except for minimal changes in the  $300 \text{ mg/m}^3$  exposure group. Since shorter term exposure levels are needed to cover times that are more consistent with Air Force operations, AEGL guidance was used to calculate military OpELs. Using the six-hour exposure for concentration and time, and the no observed adverse effect concentration for histopathological effects seen in the respiratory tract ( $100 \text{ mg/m}^3$ ) from both the acute and two-week studies, OpEL values of 28, 28, 14, 3.5, and  $1.7 \text{ mg/m}^3$  were proposed for 10 and 30 minutes and one, four, and eight hours, respectively. These preliminary



values should be protective of both inhalation effects and neurobehavioral changes that could compromise the mission and the health of the warfighter.

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## **APPENDIX A. METHOD EXCERPTS FROM ANIMAL USE PROTOCOL AND AMENDMENTS**

Excerpts from the animal use protocol and its amendments are incorporated to clarify the methods section. Only sections relevant to the methods are included.

### **Excerpts from Animal Use Protocol**

#### **II. PROTOCOL NUMBER: F-WA-2014-0154**

**III. PROTOCOL TITLE:** Toxicity Studies in Rats (*Rattus norvegicus*) and in the Mouse (*Mus musculus*) for Polyalphaolefin (PAO) Fluid

#### **V. MATERIALS AND METHODS**

##### **V.1. Experimental Design and General Procedures**

###### **Study Design**

The studies proposed in this protocol are designed to provide the necessary information to develop operational exposure limits for PAO. A number of short-term exposure limits are required because of the acute and repeat exposures of pilots and maintainers. The 90-day study is used to provide data to develop the continuous eight hour (8-hr) exposure limit that base safety personnel need to propose proper protection for Airmen. Therefore, the following inhalation exposures are proposed to obtain the data to develop acute OpELs: Acute with and without recovery, and two week. The acute study without recovery is based on the U.S. Environmental Protection Agency (EPA) guideline 870.1300, Acute Inhalation Toxicity and the Organization for Economic Cooperation and Development (OECD) guideline, Test No. 403: Acute Inhalation Toxicity. The acute study with recovery is a modification used by Mattie *et al.* (2012) to better address the acute exposure to the Hydroprocessed Esters and Fatty Acids - Mixed Fats (HEFA-F) Jet Fuel. The two-week study design is based on Organization for Economic Cooperation and Development (OECD) guideline, Test No. 412: Repeated Dose Inhalation Toxicity: 28-day or 14-day Study.

###### **Generation of Test Substance**

The test atmosphere will be generated by a spray nozzle using procedures developed during pre-study trials and similar to those used for previous acute, two-week, and 90-day jet fuel studies. Trials will be performed to evaluate the optimal set of conditions and equipment to generate a stable atmosphere at the target exposure levels. The method will be written out in the laboratory notebook and will be included in the study reports.

### **Exposure System**

Rats will be exposed by inhalation in 1-cubic meter stainless steel and glass whole body exposure chambers (H1000, Lab Products, Inc., Seaford, DE). One chamber will be used per dose group. Each chamber holds up to 3 stainless steel wire mesh cages and each cage can individually house up to 24 or 16 rats (R-24 or R-16, respectively, Lab Products, Inc., Seaford, DE). The 1-cubic meter exposure chambers will be operated at a flow rate of approximately 225 L/min to provide at least one complete air change in 4.4 minutes (13.5 air changes/hour; minimum guideline requirements are 10 air changes per hour) and a T<sub>99</sub> equilibrium time of approximately 20.5 minutes (T<sub>99</sub> is the time for the concentration of test substance in the chamber to rise from background or zero to 99% of the equilibrium or target concentration). This chamber size and airflow rate is considered adequate to maintain an oxygen level that is at least 19%, the minimum required by the guidelines. At the end of an exposure, the chamber will be operated at approximately the same, or higher, flow rate using clean air. All animals will remain in the chamber for typically 30 minutes (but a minimum of the T<sub>99</sub> equilibrium time), so that the bulk of the test material is cleared from the chamber. To minimize exposure to off-gassed test material, rats in the control chamber will be transferred from the chamber to their domiciliary caging and returned to the animal housing room in the vivarium prior to removing the test material exposed rats from their chambers. The test material-exposed rats will be held in a different animal room from the control rats to minimize exposure of the control animals to any off-gassing from the exposed rats. During the exposure period, rats will not have access to food, but will have access to water, *ad libitum*. All rats will be moved to an animal housing room during non-exposure periods.

### **Monitoring of Test Substance Concentration**

A nominal exposure concentration will be calculated. The flow of air through the chamber will be monitored using appropriate, calibrated equipment. The test substance consumed during the exposure and the total volume of air passing through the chamber (volumetric flow rate times total exposure time) will be used to calculate the nominal concentration.

During the exposure, measurements of airborne concentrations will be performed in the animals' breathing zone. Aerosol concentration will be measured using a gravimetric filter or equivalent method. Vapor concentration will be measured using an appropriate sampling procedure and analytical method (Fourier Transform Infrared Spectrophotometry (FTIR, Nicolet 380, ThermoScientific, or equivalent). The analytical method will be developed in the pre-study trials and documented in the study file.

### **Particle Size Distribution**

Particle size distribution measurement will be performed using an appropriate particle size instrument such as cascade impactor (7-stage, In-Tox Products, Moriarty, NM, or equivalent) or an optical particle size spectrometer (Aerodynamic Particle Sizer (APS) Model 3321, TSI, Inc., Shoreview, MN, or equivalent). Previous experience has shown that once the procedure has been developed for a fluid, measuring once a week is sufficient. If there is greater variability for PAO than seen in the past for other fluids, measurements will be conducted more often.

### **Uniformity**

The distribution of material within the chamber will be checked for uniformity prior to the start of exposures. Measurements of concentration will be taken at 9 port locations under steady generation conditions.

### **Monitoring of Environmental Conditions**

Chamber temperature, humidity, airflow rate, and static pressure will be monitored continuously and recorded at least three times during the exposure. Chamber temperature and relative humidity will be maintained, to the maximum extent possible, between 20 to 24°C and 30 to 70%, respectively. Temperature and relative humidity will be monitored and if levels fall outside of the reference range, the Attending Veterinarian will be notified to assess the animals for any adverse effects.

The minimum frequency of chamber monitoring activity is summarized in Table 2.

TABLE 2: Summary of Chamber Monitoring Activities

Activity	Minimum Frequency per chamber
Measured Test Substance Concentration	3 times per day
Aerosol concentration and size distribution	Acute Exposure: once 2 week and 90-day: 1 time per week
Temperature	3 times per day
Relative Humidity	3 times per day
Airflow Rate	3 times per day
Static Pressure	3 times per day
Nominal Test Substance Concentration (excluding the air control chamber)	1 time per day

### **V.1.1. Experiment 1: Acute Inhalation Toxicity Study**

#### **Duration, Frequency of Administration and Exposure Levels**

The rats in this whole-body study will be exposed for 6 hours once. Half of the rats will be euthanized 24 hours after the start of the exposure. The other half of the rats will be euthanized 14 days later to examine for recovery from any effects seen and to rule out longer term effects. Rats will be exposed to three concentrations of PAO coolant (high, intermediate and low groups), and the control rats to clean air. Exposures to PAO will be conducted at target concentrations of 100, 500, and 1000 mg/m<sup>3</sup>. These exposure concentrations were selected based on concentrations used in proprietary, unpublished industry reports for PAO lubricants.

A staggered start of two replicates of animals will be required in order to complete the neurobehavioral tests after the exposure and the necropsies the day after the exposure and at the end of the 14 day recovery period. A total of 40 animals can either be tested for neurobehavioral

endpoints or necropsied in one day, given the available personnel and facilities. In order to provide the same study conditions, the total number of control and exposure animals will be divided into two replicates. The start of exposures for each replicate will be staggered by one day in order to stagger the neurobehavioral endpoints and necropsy times throughout the study. A summary of the replicates is shown in Table 3.

TABLE 3: Acute Toxicity Study Summary Table for Rats

Group of Rats	Exposure Level mg/m <sup>3</sup>	Acute: Number of Animals/ 6 hour exposure		Acute: Number of Animals/ 6 hour exposure + 14 day recovery	
		Males	Females	Males	Females
Control Replicate 1	0	5	5	5	5
Control Replicate 2		5	5	5	5
Low Replicate 1	100	5	5	5	5
Low Replicate 2		5	5	5	5
Intermediate Replicate 1	500	5	5	5	5
Intermediate Replicate 2		5	5	5	5
High Replicate 1	1000	5	5	5	5
High Replicate 2		5	5	5	5
Total		40	40	40	40

### Acclimation Period to Exposure Cages

After quarantine period and during the week prior to start of exposures, rats will be acclimated to the stainless steel wire-mesh cages (R-16, R-24 cage units or equivalent) in the animal room. Animals will be placed in the inhalation wire mesh cages for an increasing length of time, e.g. 1 hr, 2 hr, 3 hr, 4 hr, and then 6 hr on successive days, during which time the animals will not have access to food but will have access to water, *ad libitum*.

### Observations

Rats will be observed before and after exposures for overt signs of toxicity. Animals in extremely poor health or in a possible moribund condition will be identified for further monitoring and possible euthanasia after consultation with the Attending Veterinarian and Principal Investigator. Body weights will be recorded twice prior to exposure, once after clearing quarantine and on the day of exposure. Animals will be randomly assigned to the groups in an attempt to equalize mean group body weights. Individual weights of animals placed on test will be within  $\pm 20\%$  of the mean weight for each sex. They will also be weighed the day after exposure (which is prior to euthanasia for half of the rats) and for the 14 day recovery rats, one week post exposure and prior to euthanasia. Food and water consumption will be measured by recording feed weight and water volumes at the following times for the recovery rats only: twice prior to exposure, the day after exposure, at one week post exposure and two days prior to euthanasia (days 12 to 13).

Neurobehavioral testing, which will include motor activity and the Functional Observation Battery, will be conducted immediately post exposure for the rats to be euthanized the day after exposure. For the recovery rats neurobehavioral testing will occur on day 13 after exposure, the day prior to euthanasia on day 14.

### **Postmortem Observations**

Recovery rats only will be fasted overnight because blood will be collected for clinical chemistry during necropsy. Recovery rats only will be fasted 12 to 18 hours prior to their blood draw by withdrawing food at 8 PM the day before euthanasia. A 12-18 hour overnight fast is recommended for rats before blood collection for clinical pathology (Weingand *et al.*, 1992). There will be no restriction for water. For all rats, the tissues and organs will be examined for gross pathology. All abnormal observations will be recorded. The following organ weights will be recorded: both adrenal glands, brain, right and left kidneys and liver. The following tissues will be collected for histopathology: The respiratory system will be the primary target organ system due to the route of exposure: nasal airways (4 levels), trachea, larynx, lungs (3 levels). Also to be collected will be the liver (2 levels), both kidneys, spleen, and both adrenals, brain and heart. In addition, any other tissue identified as being abnormal will be collected. The collected tissues will be preserved in formalin, processed, stained, and examined microscopically.

## **V.1.2. Experiment 2: Two-Week Inhalation Toxicity Study**

### **Duration, Frequency of Administration and Exposure Levels**

The rats in this whole-body study will be exposed for 6 hours per day, five days per week for two weeks (ten total exposures). Rats will be exposed to three concentrations of PAO coolant (high, intermediate and low groups) with the control group exposed to clean air. Exposures to PAO will be conducted at target concentrations based on the results of Experiment 1. A protocol amendment will be submitted with the target concentrations prior to conducting Experiment 2.

A staggered start of two replicates of animals will be required in order to complete the neurobehavioral tests and the necropsies at the end of this two-week study. A total of 40 animals can either be tested for neurobehavioral endpoints or necropsied in one day, given the available personnel and facilities. In order to provide the same number of exposure, the total number of control and exposure animals will be divided into two replicates. The start of exposures for each replicate will be staggered by one day in order to stagger the neurobehavioral endpoints and necropsy times at the end of the study. A summary of the replicates is shown in Table 4.

TABLE 4: Two Week Toxicity Study Summary Table for Rats

Group of Rats	Exposure Level mg/m <sup>3</sup>	Number of Animals/ 6 hour exposure Two weeks (10 exposures)	
		Males	Females
Control Replicate 1	0	5	5
Control Replicate 2		5	5
Low Replicate 1	TBD	5	5
Low Replicate 2		5	5
Intermediate Replicate 1	TBD	5	5
Intermediate Replicate 2		5	5
High Replicate 1	TBD	5	5
High Replicate 2		5	5
Total		40	40

### **Acclimation Period to Exposure Cages**

After quarantine period and during the week prior to start of exposures, rats will be acclimated from their plastic shoebox cages to the smaller stainless steel wire-mesh cages (R-16, R-24 cage units or equivalent). There is no restraint or impeding of movement involved, just a new cage that is smaller than their home cage. This acclimation will occur in their animal room or an empty animal room nearby. Animals will be placed in the inhalation wire mesh cages for an increasing length of time, e.g. 1 hr, 2 hr, 3 hr, 4 hr, and then 6 hr on successive days, during which time the animals will not have access to food but will have access to water, *ad libitum*.

### **Observations**

Body weights will be measured the day after arrival, prior to randomization for group assignment at the end of the quarantine period, daily during the acclimation period and before beginning the first PAO exposure. Animals will be randomly assigned to the groups in an attempt to equalize mean group body weights. Individual weights of animals placed on test will be within  $\pm 20\%$  of the mean weight for each sex. Body weights will be recorded daily prior to each exposure. The last recording of body weights will occur prior to euthanasia at necropsy.

Rats will be observed before and after exposures for overt signs of toxicity. Animals in extremely poor health or in a possible moribund condition will be identified for further monitoring and possible euthanasia after consultation with the Attending Veterinarian and Principal Investigator.

Food and water consumption will be measured by recording feed weight and water volumes at the following times: twice prior to exposure, at the end of each week of exposures and on the day prior to euthanasia (day13).

Neurobehavioral testing (motor activity and the Functional Observation Battery) will be conducted on day 14 after the last exposure.



### **Postmortem Observations**

The postmortem observations will be the same as the recovery rats in Experiment 1.

## **V.2. Data Analysis**

### **V.2.1. In-life Statistics**

The following items will be analyzed statistically in the final report (for male versus females) and control rats versus treated: water and food consumption and weekly mean body weight values and body weight changes (from pre-exposure) will be analyzed from In-Life Observations and hematology, coagulation, clinical chemistry, and organ weights from Postmortem Observations. Evaluation of equality of group means will be made by the appropriate statistical method, followed by a multiple comparison test if needed. Bartlett's (Bartlett, 1937) or Levene's test (Levene, 1960) will be performed to determine if groups have equal variances. Shapiro-Wilk test will be used to determine if data are from a normally distributed population (Shapiro and Wilk, 1965). If variances are equal and from a normally distributed population, a standard one-way analysis of variance (ANOVA) will be used to assess significance. If variances are unequal, Welch's ANOVA will be used (Sokal and Rohlf, 1995). If significant differences among the means are indicated, additional tests will be used to determine which means are significantly different from the control: Dunnett's (Dunnett, 1955, 1964), Williams (Williams, 1971, 1972), or Cochran and Cox's modified t-test (Cochran and Cox, 1959). If data are non-normal, nonparametric methods such as Kruskal-Wallis test (Kruskal and Wallis, 1952, 1953) will be used and if differences are indicated, Shirley's test (Shirley, 1977; Williams, 1986) or Steel's test (Steel, 1959) will be used to determine which means differed from control. Bartlett's or Levene's test for equality of variance will be conducted at the 1% significance level; all other statistical tests will be conducted at the 5% significance levels.

### **V.2.2. Motor Activity and Functional Observation Battery (FOB)**

For neurobehavioral assessments, the data for quantitative, continuous variables will be compared for the exposure and control groups by tests for homogeneity of variance, 2-way fixed effects (dose and sex) analysis of variance (ANOVA), and Dunnett's multiple comparison procedure for significant ANOVAs. If the ANOVA indicates statistical significance among experimental groups, the Dunnett's test will be used to delineate which groups differ from the control group. A natural log transformation of the data will be used if the Levene's test indicates that the data are non-homogeneous. In the event that the Levene's test on the transformed data indicates non-homogeneous data, Welch's test will be used. A nested analysis of motor activity data will be performed using a repeated measures analysis with exposure as a grouping factor and interval as a within-subject factor. Additional exposure group comparisons of total cumulative test session activity will be performed. Incidence data will be compared using the appropriate statistical test, generally Fisher's Exact test. Incidence data for selected FOA endpoints with ordered severity scores will be analyzed for group differences using appropriate measures of association. Statistical analyses will be performed using either SAS or JMP

statistical software or other statistical programs, as deemed appropriate. The probability value of less than 5% will be used as the critical level of significance for each statistical test, except that the critical level of significance for Levene's test for homogeneity of variance will be less than 1%. All other uncorrected probability values of less than 5% will be listed in the report.

#### **V.4.1.2.2. Pre- and Post-procedural Provisions**

The PI will notify the Attending Veterinarian, at least one week in advance, of all procedures that require the use of anesthesia to ensure the Attending Veterinarian's availability in the event he/she is needed.

#### **Viability Checks**

Animals will be observed for morbidity, mortality, general appearance, and signs of severe toxic or pharmacological effects before and after exposures on exposure days by the inhalation staff. Animals will be observed by staff on non-exposure days.

#### **Clinical Observations**

Each animal will be examined at least twice pre-exposure, and on the day of each exposure, and prior to euthanasia. Examinations will include observations of general condition, skin and fur, eyes, nose, oral cavity, abdomen and external genitalia as well as evaluations of respiration, circulatory effects, autonomic effects, central nervous system effects, and reactivity to handling or sensory stimuli.

Display of a physical condition or state that suggests consideration of euthanasia before the study endpoints have been developed by the Organization of Economic Cooperation and Development (OECD) (2000) and are also referenced in WPAFB IACUC Policy 01-06. The OECD clinical signs to be used as early study endpoints are listed below:

- abnormal vocalization
- abnormal aggressiveness
- abnormal reaction to handling
- abnormal external appearance (i.e., ruffled fur indicating lack of grooming, dried urine and/or feces near anogenital area)
- prolonged, impaired ambulation preventing the animal from reaching food or water, or prolonged anorexia
- excessive weight loss and/or extreme emaciation and/or severe dehydration
- evidence to suggest irreversible organ failure
- prolonged absence of voluntary responses to external stimuli
- persistent, difficult labored breathing
- prolonged inability to remain upright
- persistent convulsions
- self-mutilation, open wounds, or skin ulceration
- prolonged diarrhea

Animals consistently displaying one or more of these signs will be immediately removed from the study (i.e., euthanized).

#### **V.4.6. Euthanasia**

Rats will be deeply anesthetized with a ketamine/xylazine cocktail (intraperitoneal injection, at 40-80 mg/kg ketamine and 5-8 mg/kg xylazine), using a 1 to 5 ml syringe with a 20-23 gauge needle). Pain alleviation of anesthetized animals will be determined by testing the toe pinch reflex. When a rat or mouse is no longer responsive to toe pinch it will be considered adequately anesthetized. The process will be performed using surgical gloves, mask, and clean instruments.

Following deep anesthesia the abdomen will be opened with scissors, the diaphragm will be cut (to create a pneumothorax), the intestines moved to one side, and blood will be drawn from the caudal vena cava or heart using a 1 to 10 mL syringe with a 18-23 gauge, ½-1” needle. Following blood collection, the abdominal aorta will be transected for terminal exsanguination prior to tissue harvest. Euthanasia will occur by exsanguination.

#### **V.5. Veterinary Care**

##### **V.5.1. Husbandry Considerations**

Upon arrival, animals will be housed, fed, and watered in accordance with RSC SOP 603 (rats and mice). New animals will be segregated from the current population for a quarantine and acclimation period of 7 to 10 days. All animals with evidence of disease or physical abnormalities will be euthanized and necropsied. During the facility acclimation period, animals will be pair housed (for enrichment purposes) in solid bottom plastic cages. During cage acclimation, the rats will be individually housed within wire-mesh cages during the 1 to 6 h cage acclimation period and pair housed upon return to their domiciliary caging. Following facility and cage acclimation, rats will be individually housed at all times. Rats will be individually housed during exposure in wire mesh cages to prevent huddling and during non-exposure periods in order to monitor food and water consumption. Animals will not have access to food during cage acclimation, but will have access to water *ad libitum*. Prior to assignment to study, all animals will be examined by an animal care staff member to ascertain suitability for study.

Animal rooms will be maintained at a temperature and relative humidity in accordance with the recommendations of the NRC's *Guide for the Care and Use of Laboratory Animals*, with approximately 15 complete air changes per hour, and a 12hr/12hr electronically controlled light/dark cycle. Animal caging will be cleaned in accordance with the above SOP, and all animals will be observed twice daily by RSC personnel for any signs of pain, distress, or any other abnormalities. Animals will have access to food and water *ad libitum* except during cage acclimation and exposure.

### **V.5.3. Environmental Enrichment**

#### **V.5.3.1. Enrichment Strategy**

Animals will be pair housed for enrichment purposes during the facility and cage acclimation periods (when outside of wire mesh cages). Animals will be individually housed in the exposure chambers to enable the free flow of test atmosphere around the animal. Animals that are group housed may huddle or gather together, acting as a filter to remove test material from the atmosphere or otherwise disrupt fuel distribution within the chamber. In the domiciliary cages during non-exposure periods, they will be individually housed to monitor food consumption. Enrichment items (e.g., nylabones) may be used in domiciliary cages.

#### **V.5.3.2. Enrichment Restrictions**

Enrichment items (e.g., nylabones) may not be permitted in exposure chambers as they could interfere with the free flow of the exposure atmosphere. Additionally, PAO droplets could deposit on the enrichment items and be ingested as the animal chews on it. It is desirable to limit the ingestion of the test substance as much as possible.

## Excerpts from Specific Animal Use Protocol Amendments

**Protocol Number:** F-WA-2014-0154

**Amendment Number:** 1

**Protocol Title:** Toxicity Studies in Rats (*Rattus norvegicus*) and in the Mouse (*Mus musculus*) for Polyalphaolefin (PAO) Fluid

### 3. Proposed Change(s) to Animal Use Protocol (Other Than Personnel):

3.1 In section V.1. the Supplier of the Polyalphaolefin (PAO) Fluid identified in Table 1 needs to be changed to RADCO INDUSTRIES, INC.

3.2 In Tables 3, 4 and 5 the Exposure Level needs to be changed to  $\text{m}^3$ .

3.3 There is no requested increase in the number of rats but request changing exposures from 2 days (replicates 1 and 2) to 5 days of exposure (replicates 1 to 5) for Experiment 1. 32 rats will be exposed per day instead of 80 (Two sets of sixteen: 8 males and 8 females per set or 2 from control and 2 from each dose per sex for acute and for acute plus 14 day recovery). See new Table 3 below as 3.a. Table 3.b is also added to show exposure and sampling days over a two week period. We will conduct either 3 exposures one week and two the next, as in the table, or two exposures one week and three the next. Table 3.b shows optimum exposure days as mid-week but exposure could be conducted on any day of the week including the weekend.

TABLE 3.a: Acute Toxicity Study Summary Table for Rats

Group of Rats	Exposure Level mg/m <sup>3</sup>	Acute: Number of Animals/ 6 hour exposure		Acute: Number of Animals/ 6 hour exposure + 14 day recovery	
		Males	Females	Males	Females
Control Replicate 1	0	2	2	2	2
Control Replicate 2		2	2	2	2
Control Replicate 3		2	2	2	2
Control Replicate 4		2	2	2	2
Control Replicate 5		2	2	2	2
Low Replicate 1	100	2	2	2	2
Low Replicate 2		2	2	2	2
Low Replicate 3		2	2	2	2
Low Replicate 4		2	2	2	2
Low Replicate 5		2	2	2	2
Intermediate Replicate 1	500	2	2	2	2
Intermediate Replicate 2		2	2	2	2
Intermediate Replicate 3		2	2	2	2
Intermediate Replicate 4		2	2	2	2
Intermediate Replicate 5		2	2	2	2
High Replicate 1	1000	2	2	2	2
High Replicate 2		2	2	2	2
High Replicate 3		2	2	2	2
High Replicate 4		2	2	2	2
High Replicate 5		2	2	2	2
Total		40	40	40	40

TABLE 3.b: Exposure and Sampling Days for the Acute Toxicity Study

Days Weeks	Sun.	Monday	Tuesday	Wednesday	Thursday	Friday	Sat.
1			-Expose R1 16 M & 16 F  -MA and FOB for 8 M & 8 F	-Expose R2 16 M & 16 F  -MA and FOB for 8 M & 8 F  - Necropsy R1 8 M & 8 F	-Expose R3 16 M & 16 F  -MA and FOB for 8 M & 8 F  - Necropsy R2 8 M & 8 F	- Necropsy R3 8 M & 8 F	
2				-Expose R4 16 M & 16 F  -MA and FOB for 8 M & 8 F	-Expose R5 16 M & 16 F  -MA and FOB for 8 M & 8 F  - Necropsy R4 8 M & 8 F	- Necropsy R5 8 M & 8 F	
3		R1 -MA and FOB for 8 M & 8 F	R2 -MA and FOB for 8 M & 8 F  - Necropsy R1 8 M & 8 F	R3 -MA and FOB for 8 M & 8 F  - Necropsy R2 8 M & 8 F	- Necropsy R3 8 M & 8 F		
4			R4 -MA and FOB for 8 M & 8 F	R5 -MA and FOB for 8 M & 8 F  - Necropsy R4 8 M & 8 F	- Necropsy R5 8 M & 8 F		

Experiment 2, Two Week Toxicity Study, will remain as 2 replicates but Table 4 was expanded into Table 4.a Two Week Toxicity Study Summary Table for Rats (no change to the original Table 4 except for adding “a” in the title) and into Table 4.b showing exposure and sampling days. See below:

Table 4.b Exposure and Sampling Days for the Two Week Toxicity Study with 10 Exposures per Replicate.

Days Weeks	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1				-Expose R1 20 M & 20 F	-Expose R1 20 M & 20 F  Expose R2 20 M & 20 F	Expose R2 20 M & 20 F	
2	-Expose R1 20 M & 20 F	-Expose R1 20 M & 20 F  Expose R2 20 M & 20 F	-Expose R1 20 M & 20 F  Expose R2 20 M & 20 F	-Expose R1 20 M & 20 F  Expose R2 20 M & 20 F	-Expose R1 20 M & 20 F  Expose R2 20 M & 20 F	Expose R2 20 M & 20 F	
3	-Expose R1 20 M & 20 F	-Expose R1 20 M & 20 F  Expose R2 20 M & 20 F	MA R1 20 M & 20 F  Expose R2 20 M & 20 F	-Expose R1 20 M & 20 F  MA R2 20 M & 20 F	FOB R1 20 M & 20 F  Necropsy R1 20 M & 20 F  Expose R2 20 M & 20 F	FOB R2 20 M & 20 F  Necropsy R2 20 M & 20 F	



**Protocol Number:** F-WA-2014-0154

**Amendment Number:** 2

**Protocol Title:** Toxicity Studies in Rats (*Rattus norvegicus*) and in the Mouse (*Mus musculus*) for Polyalphaolefin (PAO) Fluid

### **3. Proposed Change(s) to Animal Use Protocol (Other Than Personnel):**

#### **V.1.1. Experiment 1: Acute Inhalation Toxicity Study**

##### **Postmortem Observations**

Recovery rats only will be fasted overnight because blood will be collected for clinical chemistry during necropsy (See section V.4.3.2). Recovery rats only will be fasted 12 to 18 hours prior to their blood draw by withdrawing food at 8 PM the day before euthanasia. A 12-18 hour overnight fast is recommended for rats before blood collection for clinical pathology (Weingand *et al.*, 1992).

##### **Amend section to read:**

Recovery rats only will be fasted overnight because blood will be collected for clinical chemistry during necropsy. Recovery rats only will be fasted 12 to 18 hours prior to their blood draw by withdrawing food at between 8 and 10 PM the day before euthanasia to allow the necropsy to take place between 8 am and 4 pm the following day. A 12-18 hour overnight fast is recommended for rats before blood collection for clinical pathology (Weingand *et al.*, 1992). All necropsies will be planned to be conducted at approximately the same time of day.

**Protocol Title:** Toxicity Studies in Rats (*Rattus norvegicus*) and in the Mouse (*Mus musculus*) for Polyalphaolefin (PAO) Fluid

### 3. Proposed Change(s) to Animal Use Protocol (Other Than Personnel):

1. This amendment is necessary to identify the target doses for Experiment 2: Two-Week Inhalation Toxicity Study. Based on the results of Experiment 1, the doses will be 0, 20, 100 and 300 mg/m<sup>3</sup>.
2. Experiment 2, Two Week Toxicity Study, will remain as 2 replicates but Table 4.b showing exposure and sampling days as approved in Amendment 1. needs to be modified slightly as shown below:

Table 4.b Exposure and Sampling Days for the Two Week Toxicity Study with 10 Exposures per Replicate.

Days	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Weeks							
1	Exposure R1 40M	Exposure R1 40M	Exposure R1 40M	Exposure R1 40M	Exposure R1 40M		
2	Exposure R1 40M	Exposure R1 40M	Exposure R1 40M	Exposure R1 40M FOB R1	Exposure R1 40M MA R1		
	Exposure R2 40F	Exposure R2 40F	Exposure R2 40F	Exposure R2 40F	Exposure R2 40F	Necropsy R1	
3							
	Exposure R2 40F	Exposure R2 40F	Exposure R2 40F	Exposure R2 40F FOB R2	Exposure R2 40F MA R2	Necropsy R2	
	Replicate 1 = males						
	Replicate 2 = female						

## APPENDIX B. RADCO XCEL THERM® 500M SAFETY DATA SHEET



### XCEL THERM® 500M HYDRAULIC FLUID MATERIAL SAFETY DATA SHEET

#### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Name**

XCEL THERM® 500M COOLANT FLUID, HYDROLYTICALLY STABLE, DIELECTRIC

Meets Military Specification MIL-PRF-87252C

Qualification# AFPET/PTPE 11-006 Dated: 20 APRIL 2011

NSNs: 9150-01-306-2475, 9150-01-336-7174, 9150-01-304-0885, 9160-01-380-2175, 9150-01-306-2470

**Company Identification**

Radco Industries Inc.

PO BOX 305

LaFox, IL 60147

ISO 9001:2000 Certification Number: C2009-00209

Customer information number: 1-630-232-7966

Shipping emergency or off hour rush orders number: 1-630-336-6728

**EMERGENCY TELEPHONE NUMBER****Advisory Office in case of poisoning:**

Chemtrec ( North America): 1-800-424-9300

Chemtrec al (International): 1-703-527-3887

#### SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	% Content	CAS
Polyalphaolefin base stock	80-100	68649-11-6
Proprietary Additive Package	0.5-20 %	None

#### SECTION 3. HAZARDS IDENTIFICATION

**Emergency Overview**

Caution! May cause eye and skin irritation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

**Potential Health Effects****Eye**

No significant irritation expected.

**Ingestion**

Significant adverse health effects are not expected if small amounts (less than a mouthful) are swallowed.

**Inhalation**

Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation. Harmful if aspirated into lungs.

**Skin Contact**

No significant irritation expected.



### SECTION 3. HAZARDS IDENTIFICATION continued

#### HMIS

Health: 1	Fire: 1	Reactivity: 0
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#### NFPA Codes

Health: 1	Fire: 1	Reactivity: 0
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### SECTION 4. FIRST AID MEASURES

#### Eyes

Immediately flush eyes with plenty of water for at least 15 minutes.

#### Ingestion

If swallowed, drink plenty of water, DO NOT induce vomiting. Immediately call a doctor.

#### Inhalation

If adverse effects occur, remove to uncontaminated area. Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

#### Skin

Wash exposed skin with soap and water.

### SECTION 5. FIRE FIGHTING MEASURES

#### Suitable Extinguishing Media

Agents approved for Class B hazards:

- Dry chemical
- Carbon dioxide
- Halogenated agents
- Foam
- Steam
- Water fog

#### Fire Fighting Equipment

Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

#### Unusual Fire and Explosion Hazards

None Identified.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

#### Action to take for spills/leaks

Prevent spreading by diking, ditching, or absorbing on inert materials. Keep out of sewers and waterways.

### SECTION 7. HANDLING AND STORAGE

#### Handling

Do not breathe vapors. Avoid ingestion.

#### Storage

Store at temperatures between 10°C and 50°C.



#### SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

##### Exposure guidelines

Component	CAS#	Exposure Limits
Polyalphaolefin base stock	68649-11-6	None Established

##### Eye protection

Safety glasses, chemical goggles, or face shields recommended to prevent contact.

##### Skin protection

Wear clothing and gloves that cannot be penetrated by chemicals or oil.

##### Ventilation

Use with adequate ventilation. Avoid breathing vapor. If heated and ventilation is inadequate, use NIOSH certified respirator, which will protect against organic vapor.

#### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear liquid
Odor:	Odorless
pH:	Not determined
Boiling point:	Not determined
Flash point (COC):	325 F (163 C) (COC)
Fire point (COC):	350 F (177 C) (COC)
Flammability Classification:	Not flammable
Auto ignition temperature:	625 F (329 C) (COC)
Solubility in water:	Negligible, < 0.1%
Specific gravity at 15.6°C (60°F):	0.80
Viscosity at 100°C (212°F):	1.65 - 2.10 cSt

#### SECTION 10. STABILITY AND REACTIVITY

##### Conditions to avoid

Temperature sources which induce thermal decomposition.

##### Dangerous reactions

No dangerous reactions known.

##### Hazardous polymerization

Will not occur



#### SECTION 10. STABILITY AND REACTIVITY continued

##### Hazardous decomposition products

Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

##### Materials to avoid

Avoid contact with strong oxidizing agents.

##### Stability

Stable

#### SECTION 11. TOXICOLOGICAL INFORMATION

##### Acute Toxicity

No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program, the U.S. Occupational Safety and Health Act, or the International Agency on Research on Cancer (IARC).

##### Dermal LD50

Testing not conducted. See other Toxicity Data.

##### Eye

Testing not conducted. See other Toxicity Data.

##### Inhalation LD50

Testing not conducted. See other Toxicity Data.

##### Oral LD50

Testing not conducted. See other Toxicity Data.

##### Skin irritation

Testing not conducted. See other Toxicity Data.

##### Sensitization

Testing not conducted. See other Toxicity Data.

#### SECTION 12. ECOLOGICAL INFORMATION

##### Aquatic toxicity

No data available

#### SECTION 13. DISPOSAL INFORMATION

Disposal must be in accordance with applicable federal, state, or local regulations.

Do not allow product to reach ground water, water course, or sewage systems.

##### RCRA

This unused material, when discarded or disposed of, is not specifically listed as a hazardous waste in Federal regulations; however, it could be considered hazardous if it meets criteria for being toxic, corrosive, ignitable, or reactive according to U.S. EPA definitions (40 CFR Subpart C). This material could also become hazardous waste if it is mixed with or comes into contact with a listed hazardous waste. If it is a hazardous waste, regulations in 40 CFR 262-266, 268, 270, and 279 may apply.



#### SECTION 14. TRANSPORT INFORMATION

**U.S. Dept. of Transportation Shipping Name**  
Not regulated.

**Canadian Transportation of Dangerous Goods Shipping Name**  
Not regulated.

**European Rail/Road (ADR/RID) Shipping Name**  
Not regulated.

**Air (ICAO/IATA) Shipping Name**  
Not regulated.

**Sea (IMO/IMDG)**  
Not regulated.

#### SECTION 15. REGULATORY INFORMATION

##### United States Regulatory Information

**California (Proposition 65)**

This product does not contain any of the substances known to the State of California to cause cancer, birth defects, or reproductive harm.

**CERCLA Reportable Quantity**

This product is not reportable under 40 CFR Part 302.4.

**Environmental Protection Agency**

None of the ingredients are listed

**National Toxicology Program (NTP)**

None of the ingredients are listed.

**OSHA Hazard Communication Standard**

Not hazardous per 29 CFR 1910.1200(d).

**SARA Title III Section 302 Extremely Hazardous Substances (40 CFR Part 355)**

This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

**SARA Title III Sections 311/312 Hazardous Categorization (40 CFR Part 370)**

Hazardous categories for this product are: Acute=no; Chronic=no; Fire=no; Pressure=no; Reactive=no.

**SARA Title III Section 313 (40 CFR Part 372)**

This product is not regulated under Section 313 of SARA and 40 CFR Part 372

**U.S. Inventory (TSCA)**

Listed on inventory.

##### International Regulatory Information

**Australia Inventory (AICS)**

Listed on inventory.



#### SECTION 15. REGULATORY INFORMATION continued

**Canada Inventory (DSL)**

All of the ingredients are listed.

**Canada (WHMIS)**

Not a controlled Product under Canada's Workplace Hazardous Material Information System.

**China (CICS)**

None of the ingredients are listed.

**EC Inventory (EINECS/ELINCS)**

In Compliance

**International Agency for Research on Cancer (IARC)**

None of the ingredients are listed.

**Japan Inventory (MITI)**

Listed on inventory.

**Korea Inventory (ECL)**

Listed on inventory.

**Philippine Inventory (PICCS)**

Not determined

**Harmful R-phrases**

Harmful by inhalation and if swallowed.

**S-phrases**

Keep container in a well ventilated place.

After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing and gloves.

This material and its container must be disposed of as hazardous waste.

#### SECTION 16. OTHER INFORMATION

**Product use:** Heat transfer fluid / Coolant Fluid

**Legend**

CAS	Chemical Abstract Service Number
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
OSHA	Occupational Safety and Health Administration
STP	Standard temperature and pressure

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## APPENDIX C. ACUTE STUDY INHALATION EXPOSURE DATA

### Particle Size Distribution Results from Cascade Impactor

Study Day	Low Chamber (100 mg/m <sup>3</sup> )		Intermediate Chamber (500 mg/m <sup>3</sup> )		High Chamber (1000 mg/m <sup>3</sup> )	
	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD
1	1.95	2.06	1.91	1.96	2.16	1.98
2	1.82	2.11	1.90	2.02	2.16	2.00
3	1.90	2.12	1.91	2.02	2.11	2.07
4	1.80	1.94	1.92	1.93	2.13	1.97
5	1.91	2.03	1.97	1.96	2.16	2.02
Average	1.88	2.05	1.92	1.98	2.14	2.01
Standard Deviation	0.06	0.07	0.03	0.04	0.02	0.04
Minimum	1.80	1.94	1.90	1.93	2.11	1.97
Maximum	1.95	2.12	1.97	2.02	2.16	2.07
N	5	5	5	5	5	5

GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter

## Daily Measured PAO Concentrations

Study Day	Control Chamber	
	Duration (min)	Measured Concentration* (mg/m <sup>3</sup> )
1	25	6.3
	137	0.14
	119	0.17
2	90	-0.88
	90	-0.33
	90	-0.11
3	90	1.44
	90	0.33
	90	0.11
4	25	-0.4
	90	0
	90	-0.4
5	90	0.22
	90	0.89
	90	-0.11
Time Weighted Average		0.2
Time Weighted SD		1.0
Minimum		-0.9
Maximum		6.3
N		15

\*Determined by gravimetric filter samples; SD = standard deviation

Study Day	Low Concentration Chamber (100 mg/m <sup>3</sup> )			
	Duration (min)	Measured Concentration* (mg/m <sup>3</sup> )	Nominal Concentration (mg/m <sup>3</sup> )	% of Nominal
1	25	81.2	259.6	31.3%
	90	101.3		39.0%
	74	99.8		38.4%
2	90	101.76	211.9	48.0%
	90	103.56		48.9%
	90	100.67		47.5%
3	90	103.52	246.2	42.0%
	90	103.11		41.9%
	90	100.77		40.9%
4	25	102	267.7	38.1%
	90	102.67		38.4%
	90	100.33		37.5%
5	90	104.44	267.9	39.0%
	90	104.78		39.1%
	90	102.44		38.2%
Time Weighted Average		101.8	250.7	41.2%
Time Weighted SD		3.5	23.4	4.3%
Minimum		81.2	211.9	31.3%
Maximum		104.8	267.9	48.9%
N		15	5	15

\*Determined by gravimetric filter samples; Nominal concentration is calculated from total mass of test chemical used per volume of air; SD = standard deviation

Study Day	Intermediate Concentration Chamber (500 mg/m <sup>3</sup> )			
	Duration (min)	Measured Concentration* (mg/m <sup>3</sup> )	Nominal Concentration (mg/m <sup>3</sup> )	% of Nominal
1	25	474.1	1021.8	46.4%
	90	501.7		49.1%
	121	488.5		47.8%
2	90	490.21	1021.3	48.0%
	90	483.83		47.4%
	90	481.44		47.1%
3	90	489.11	1026.9	47.6%
	90	490.21		47.7%
	90	492.3		47.9%
4	25	484.8	1021.8	47.4%
	90	488.67		47.8%
	90	487.33		47.7%
5	90	503.11	1028.2	48.9%
	90	491.11		47.8%
	90	492.67		47.9%
Time Weighted Average		490.3	1024.0	47.9%
Time Weighted SD		6.4	3.3	0.6%
Minimum		474.1	1021.3	46.4%
Maximum		503.1	1028.2	49.1%
N		15	5	15

\*Determined by gravimetric filter samples; Nominal concentration is calculated from total mass of test chemical used per volume of air; SD = standard deviation

Study Day	High Concentration Chamber (1000 mg/m <sup>3</sup> )			
	Duration (min)	Measured Concentration* (mg/m <sup>3</sup> )	Nominal Concentration (mg/m <sup>3</sup> )	% of Nominal
1	25	903.4	2624.6	34.4%
	90	974.7		37.1%
	120	972.4		37.0%
2	90	990.98	2693.2	36.8%
	90	969.09		36.0%
	90	953.92		35.4%
3	90	981.78	2669.1	36.8%
	90	978.33		36.7%
	90	966.44		36.2%
4	25	1034	2681.3	38.6%
	90	979.78		36.5%
	90	978.44		36.5%
5	90	1025.89	2690.0	38.1%
	90	1001.78		37.2%
	90	990.78		36.8%
Time Weighted Average		981.1	2671.6	36.7%
Time Weighted SD		22.1	27.9	0.8%
Minimum		903.4	2624.6	34.4%
Maximum		1034.0	2693.2	38.6%
N		15	5	15

\*Determined by gravimetric filter samples; Nominal concentration is calculated from total mass of test chemical used per volume of air; SD = standard deviation

### PAO Consumption for Determination of Nominal Concentration

Study Day	Low Concentration Chamber (100 mg/m <sup>3</sup> )					
	Start (g)	End (g)	Difference (g)	Air Flow (L/minute)*	Exposure Time (minutes)	Nominal Concentration (mg/m <sup>3</sup> )
1	1052.9	1031.9	21.0	224.7	360	259.6
2	1027.6	1010.6	17.0	222.9	360	211.9
3	683.7	663.8	19.9	224.5	360	246.2
4	651.1	629.5	21.6	224.1	360	267.7
5	629.5	607.9	21.6	224.0	360	267.9

Nominal = Difference / (Air Flow \* Exposure Time); \*Value is the sum of supply air flow plus generator air flow of 38 L/minute

Study Day	Intermediate Concentration Chamber (500 mg/m <sup>3</sup> )					
	Start (g)	End (g)	Difference (g)	Air Flow (L/minute)*	Exposure Time (minutes)	Nominal Concentration (mg/m <sup>3</sup> )
1	1015.2	932.8	82.4	224.0	360	1021.8
2	932.7	850.6	82.1	223.3	360	1021.3
3	851.5	768.8	82.7	223.7	360	1026.9
4	860.9	778.5	82.4	224.0	360	1021.8
5	778.5	695.7	82.8	223.7	360	1028.2

Nominal = Difference / (Air Flow \* Exposure Time); \*Value is the sum of supply air flow plus generator air flow of 38 L/minute

Study Day	High Concentration Chamber (1000 mg/m <sup>3</sup> )					
	Start (g)	End (g)	Difference (g)	Air Flow (L/minute)*	Exposure Time (minutes)	Nominal Concentration (mg/m <sup>3</sup> )
1	1106.6	895.8	210.8	223.1	360	2624.6
2	895.7	679.1	216.6	223.4	360	2693.2
3	999.9	783.7	216.2	225	360	2669.1
4	1039.2	822.4	216.8	224.6	360	2681.3
5	822.3	604.6	217.7	224.8	360	2690.0

Nominal = Difference / (Air Flow \* Exposure Time); \*Value is the sum of supply air flow plus generator air flow of 38 L/minute

### Daily Averages for Environmental Parameters

Study Day	Control Chamber			
	Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
1	24.1	44.6	0.06	228.1
2	22.6	45.8	0.17	227.7
3	22.6	46.7	0.17	227.5
4	22.6	49.8	0.18	227.3
5	22.2	55.0	0.18	227.0
Average	22.8	48.4	0.15	227.5
SD	0.7	4.2	0.05	0.4
Minimum	22.2	44.6	0.06	227.0
Maximum	24.1	55.0	0.18	228.1
N	5	5	5	5

SD = standard deviation

Study Day	Low Concentration Chamber (100 mg/m <sup>3</sup> )			
	Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)*
1	22.9	43.1	-0.29	224.7
2	21.1	44.7	-0.27	222.9
3	20.9	46.4	-0.26	224.5
4	21.3	48.6	-0.26	224.1
5	20.9	53.3	-0.27	224.0
Average	21.4	47.2	-0.27	224.0
SD	0.8	4.0	0.01	0.7
Minimum	20.9	43.1	-0.29	222.9
Maximum	22.9	53.3	-0.26	224.7
N	5	5	5	5

SD = standard deviation; \*Value is the sum of supply air flow plus generator air flow of 38 L/min

Study Day	Intermediate Concentration Chamber (500 mg/m <sup>3</sup> )			
	Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)*
1	23.0	43.0	-0.31	224.0
2	21.2	42.6	-0.29	223.3
3	21.2	44.0	-0.28	223.7
4	21.7	45.0	-0.28	224.0
5	21.1	50.9	-0.29	223.7
Average	21.6	45.1	-0.29	223.7
SD	0.8	3.4	0.01	0.3
Minimum	21.1	42.6	-0.31	223.3
Maximum	23.0	50.9	-0.28	224.0
N	5	5	5	5

SD = standard deviation; \*Value is the sum of supply air flow plus generator air flow of 38 L/min



Study Day	High Concentration Chamber (1000 mg/m <sup>3</sup> )			
	Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)*
1	23.6	40.2	-0.24	223.1
2	21.4	43.0	-0.21	223.4
3	21.4	43.6	-0.20	225.0
4	22.0	47.2	-0.20	224.6
5	21.6	49.4	-0.20	224.8
Average	22.0	44.7	-0.21	224.2
SD	0.9	3.6	0.02	0.9
Minimum	21.4	40.2	-0.24	223.1
Maximum	23.6	49.4	-0.20	225.0
N	5	5	5	5

SD = standard deviation; \*Value is the sum of supply air flow plus generator air flow of 38 L/min

## APPENDIX D. ACUTE STUDY NEUROBEHAVIORAL ASSAY OBSERVATIONS

### Male FOB Observations for Acute PAO Exposure Study: Acute Cohort

Cage side Observations				Protocol number		PAO ACUTE								
Date	7/21/2015-7/29/15													
Animal ID	Condition	Sex	Body Weight	Observational Time	Posture	Tremor	Severity	Induction	Spasm	Location	Seizures	Clonic Convulsions	Seizure Severity	Palpebral Closure
1	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
41	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
81	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
121	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
3	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
43	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
83	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
123	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
9	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
49	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
89	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
129	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
11	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
51	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
91	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
131	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
17	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
57	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
97	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
137	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
19	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
59	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
99	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
139	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
25	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
65	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
105	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
145	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
27	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
67	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
107	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
147	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
33	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
73	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
113	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
153	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
35	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
75	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
115	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
155	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
C=control=0 mg/m <sup>3</sup> ; L=low=300 mg/m <sup>3</sup> , M=mid=intermediate=500 mg/m <sup>3</sup> ; H=high=1000 mg/m <sup>3</sup>														

Cage side Observations														
Date		7/21/2015-7/29/15												
Animal ID	Condition	Sex	Removal Time	Handling Reactivity	Piloerection	Muscle Tone	Lacrimation	Salivation	Fur Appearance	Facial Crust	Skin	Breathing Pattern	Additional Observations	
1	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
41	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
81	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
121	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
3	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
43	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
83	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
123	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
9	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
49	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
89	M	M	2:30-4:00	4	0	1	0	0	1	0	1	1	0	0
129	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
11	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
51	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
91	M	M	2:30-4:00	4	0	1	0	0	1	0	1	1	0	0
131	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
17	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
57	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
97	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
137	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
19	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
59	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
99	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
139	H	M	2:30-4:00	1	0	1	0	0	3	0	1	1	0	0
25	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
65	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
105	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
145	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
27	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
67	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
107	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
147	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
33	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
73	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
113	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
153	H	M	2:30-4:00	4	0	1	0	0	3	0	1	1	0	0
35	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
75	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
115	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0	0
155	H	M	2:30-4:00	1	0	1	0	0	3	0	1	1	0	0
				1=Normal					1=Normal					
				4=Passive					3=Wet					

Manipulative Observations			Protocol number		PAO ACUTE									
Date	7/21/2015-7/29/15													
Animal ID	Condition	Sex	Approach Response	Acoustic Response	Tail Pinch Response	Visual Placing	Surface Righting	Quantitative Data						
								Forelimp Grip	ForeAvg	Hindlimb Grip	HindAvg			
1	C	M	1	1	1	1	1	0.315	0.420	0.368	0.035	0.022	0.029	
41	L	M	1	1	1	1	1	0.515	0.225	0.370	0.025	0.016	0.021	
81	M	M	1	1	1	1	1	0.360	0.255	0.308	0.020	0.020	0.020	
121	H	M	1	1	1	1	1	0.295	0.475	0.385	0.016	0.027	0.022	
3	C	M	1	1	1	1	1	0.240	0.515	0.378	0.024	0.028	0.026	
43	L	M	1	1	1	1	1	0.510	0.365	0.438	0.021	0.023	0.022	
83	M	M	1	1	1	1	1	0.490	0.270	0.380	0.033	0.025	0.029	
123	H	M	1	1	1	1	1	0.445	0.295	0.370	0.019	0.028	0.024	
9	C	M	1	1	1	1	1	0.725	0.495	0.610	0.011	0.016	0.014	
49	L	M	1	1	1	1	1	0.480	0.485	0.483	0.035	0.029	0.032	
89	M	M	1	1	1	1	1	0.340	0.315	0.328	0.210	0.044	0.127	
129	H	M	1	1	1	1	1	0.595	0.305	0.450	0.033	0.023	0.028	
11	C	M	1	1	1	1	1	0.340	0.525	0.433	0.029	0.031	0.030	
51	L	M	1	1	1	1	1	0.560	0.325	0.443	0.025	0.029	0.027	
91	M	M	1	1	1	1	1	0.565	0.565	0.565	0.025	0.015	0.020	
131	H	M	1	1	1	1	1	0.290	0.565	0.428	0.022	0.030	0.026	
17	C	M	1	1	1	1	1	0.265	0.340	0.303	0.020	0.024	0.022	
57	L	M	1	1	1	1	1	0.270	0.435	0.353	0.033	0.020	0.027	
97	M	M	1	1	1	1	1	0.405	0.450	0.428	0.026	0.013	0.020	
137	H	M	1	1	1	1	1	0.330	0.435	0.383	0.032	0.022	0.027	
19	C	M	1	1	1	1	1	0.270	0.435	0.353	0.036	0.030	0.033	
59	L	M	1	1	1	1	1	0.340	0.360	0.350	0.019	0.021	0.020	
99	M	M	1	1	1	1	1	0.225	0.515	0.370	0.020	0.021	0.021	
139	H	M	1	1	1	1	1	0.295	0.270	0.283	0.010	0.170	0.090	
25	C	M	1	1	1	1	1	0.465	0.315	0.390	0.026	0.023	0.025	
65	L	M	1	1	1	1	1	0.305	0.037	0.171	0.043	0.024	0.034	
105	M	M	1	1	1	1	1	0.470	0.470	0.470	0.030	0.034	0.032	
145	H	M	1	1	1	1	1	0.435	0.400	0.418	0.031	0.032	0.032	
27	C	M	1	1	1	1	1	0.550	0.290	0.420	0.047	0.028	0.038	
67	L	M	1	1	1	1	1	0.315	0.545	0.430	0.026	0.018	0.022	
107	M	M	1	1	1	1	1	0.610	0.235	0.423	0.031	0.030	0.031	
147	H	M	1	1	1	1	1	0.390	0.250	0.320	0.027	0.023	0.025	
33	C	M	1	1	1	1	1	0.475	0.355	0.415	0.024	0.022	0.023	
73	L	M	1	1	1	1	1	0.610	0.380	0.495	0.020	0.027	0.024	
113	M	M	1	1	1	1	1	0.495	0.400	0.448	0.019	0.014	0.017	
153	H	M	1	1	1	1	1	0.315	0.150	0.233	0.024	0.021	0.023	
35	C	M	1	1	1	1	1	0.580	0.355	0.468	0.036	0.032	0.034	
75	L	M	1	1	1	1	1	0.270	0.280	0.275	0.022	0.018	0.020	
115	M	M	1	1	1	1	1	0.360	0.405	0.383	0.033	0.015	0.024	
155	H	M	1	1	1	1	1	0.325	0.365	0.345	0.016	0.020	0.018	
								Grip Units=kg (peak value)						

## Male FOB Observations for Acute PAO Exposure Study: Recovery Cohort

Cage side Observations					Protocol number		PAO DELAY							
Date	8/3/2015-8/11/2015													
			Body	Observational								Clonic	Seizure	Palpebral
Animal ID	Condition	Sex	Weight	Time	Posture	Tremor	Severity	Induction	Spasm	Location	Seizures	Convulsions	Severity	Closure
5	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
45	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
85	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
125	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
7	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
47	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
87	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
127	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
13	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
53	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
93	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
133	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
15	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
55	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
95	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
135	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
21	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
61	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
101	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
141	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
23	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
63	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
103	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
143	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
29	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
69	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
109	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
149	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
31	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
71	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
111	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
151	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
37	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
77	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
117	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
157	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
39	C	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
79	L	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
119	M	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
159	H	M	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
C=control=0 mg/m^3; L=low=300 mg/m^3,														
M=mid=intermediate=500 mg/m^3; H=high=1000 mg/m^3														

Cage side Observations														
Date		8/3/2015-8/11/2015												
Animal ID	Condition	Sex	Removal	Handling	Muscle			Salivation	Fur	Facial	Breathing		Additional	
			Time	Reactivity	Piloerection	Tone	Lacrimation		Appearance	Crust	Skin	Pattern	Observations	
5	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
45	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
85	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
125	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
7	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
47	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
87	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
127	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
13	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
53	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
93	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
133	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
15	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
55	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
95	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
135	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
21	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
61	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
101	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
141	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
23	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
63	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
103	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
143	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
29	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
69	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
109	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
149	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
31	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
71	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
111	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
151	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
37	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
77	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
117	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
157	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
39	C	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
79	L	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
119	M	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
159	H	M	1:00-2:30	1	0	1	0	0	1	0	1	1	0	0
				1=Normal					1=Normal					
				4=Passive					3=Wet					

Manipulative Observations			Protocol number			PAO DELAY								
Date	8/3/2015-8/11/2015													
Animal ID	Condition	Sex	Approach Response	Acoustic Response	Tail Pinch Response	Visual Placing	Surface Righting	Quantitative Data						
								Forelimp Grip	ForeAvg	Hindlimb Grip	HindAvg			
5	C	M	1	1	1	1	1	0.370	0.240	0.305	0.040	0.017	0.029	
45	L	M	1	1	1	1	1	0.400	0.325	0.363	0.034	0.021	0.028	
85	M	M	1	1	1	1	1	0.450	0.205	0.328	0.018	0.026	0.022	
125	H	M	1	1	1	1	1	0.570	0.395	0.483	0.017	0.025	0.021	
7	C	M	1	1	1	1	1	0.355	0.430	0.393	0.019	0.022	0.021	
47	L	M	1	1	1	1	1	0.380	0.465	0.423	0.054	0.011	0.033	
87	M	M	1	1	1	1	1	0.510	0.230	0.370	0.053	0.044	0.049	
127	H	M	1	1	1	1	1	0.305	0.320	0.313	0.030	0.014	0.022	
13	L	M	1	1	1	1	1	0.535	0.485	0.510	0.085	0.020	0.053	
53	M	M	1	1	1	1	1	0.550	0.375	0.463	0.040	0.020	0.030	
93	H	M	1	1	1	1	1	0.400	0.265	0.333	0.039	0.027	0.033	
133	C	M	1	1	1	1	1	0.355	0.255	0.305	0.034	0.021	0.028	
15	L	M	1	1	1	1	1	0.305	0.370	0.338	0.024	0.045	0.035	
55	M	M	1	1	1	1	1	0.265	0.320	0.293	0.032	0.032	0.032	
95	H	M	1	1	1	1	1	0.505	0.365	0.435	0.036	0.047	0.042	
135	C	M	1	1	1	1	1	0.430	0.465	0.448	0.038	0.039	0.039	
21	M	M	1	1	1	1	1	0.530	0.570	0.550	0.029	0.028	0.029	
61	H	M	1	1	1	1	1	0.510	0.270	0.390	0.047	0.045	0.046	
101	C	M	1	1	1	1	1	0.495	0.035	0.265	0.034	0.033	0.034	
141	L	M	1	1	1	1	1	0.365	0.320	0.343	0.021	0.022	0.022	
23	M	M	1	1	1	1	1	0.485	0.370	0.428	0.024	0.031	0.028	
63	H	M	1	1	1	1	1	0.490	0.360	0.425	0.019	0.025	0.022	
103	C	M	1	1	1	1	1	0.600	0.485	0.543	0.018	0.019	0.019	
143	L	M	1	1	1	1	1	0.455	0.580	0.518	0.015	0.015	0.015	
29	H	M	1	1	1	1	1	0.550	0.350	0.450	0.058	0.035	0.047	
69	C	M	1	1	1	1	1	0.510	0.485	0.498	0.065	0.016	0.041	
109	L	M	1	1	1	1	1	0.440	0.335	0.388	0.024	0.026	0.025	
149	M	M	1	1	1	1	1	0.480	0.405	0.443	0.046	0.031	0.039	
31	H	M	1	1	1	1	1	0.445	0.270	0.358	0.036	0.022	0.029	
71	C	M	1	1	1	1	1	0.605	0.365	0.485	0.054	0.018	0.036	
111	L	M	1	1	1	1	1	0.475	0.270	0.373	0.042	0.063	0.053	
151	M	M	1	1	1	1	1	0.506	0.260	0.383	0.034	0.022	0.028	
37	C	M	1	1	1	1	1	0.365	0.475	0.420	0.031	0.040	0.036	
77	L	M	1	1	1	1	1	0.425	0.470	0.448	0.024	0.025	0.025	
117	M	M	1	1	1	1	1	0.505	0.425	0.465	0.017	0.029	0.023	
157	H	M	1	1	1	1	1	0.235	0.355	0.295	0.034	0.054	0.044	
39	C	M	1	1	1	1	1	0.515	0.495	0.505	0.042	0.042	0.042	
79	L	M	1	1	1	1	1	0.415	0.350	0.383	0.035	0.035	0.035	
119	M	M	1	1	1	1	1	0.490	0.470	0.480	0.063	0.049	0.056	
159	H	M	1	1	1	1	1	0.210	0.330	0.270	0.071	0.047	0.059	
									Grip Units=kg (peak value)					

## Female FOB Observations for Acute PAO Exposure Study: Acute Cohort

Cage side Observations				Protocol number PAO ACUTE										
Date		7/21/2015-7/29/15												
			Body	Observational								Clonic	Seizure	Palpebral
Animal ID	Condition	Sex	Weight	Time	Posture	Tremor	Severity	Induction	Spasm	Location	Seizures	Convulsions	Severity	Closure
2	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
42	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
82	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
122	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
4	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
44	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
84	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
124	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
10	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
50	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
90	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
130	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
12	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
52	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
92	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
132	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
18	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
58	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
98	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
138	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
20	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
60	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
100	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
140	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
26	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
66	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
106	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
146	H	F	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A	3
28	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
68	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
108	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
148	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
34	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
74	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
114	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
154	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
36	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
76	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
116	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
156	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
C=control=0 mg/m^3; L=low=300 mg/m^3,														
M=mid=intermediate=500 mg/m^3; H=high=1000 mg/m^3														



Cage side Observations														
Date		7/21/2015-7/29/15												
Animal ID	Condition	Sex	Removal	Handling	Muscle			Salivation	Fur	Facial	Breathing		Additional	
			Time	Reactivity	Piloerection	Tone	Lacrimation		Appearance	Crust	Skin	Pattern	Observations	Comments
2	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
42	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
82	M	F	2:30-4:00	4	0	1	0	0	1	0	1	1	0	
122	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
4	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
44	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
84	M	F	2:30-4:00	4	0	1	0	0	1	0	1	1	0	
124	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
10	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
50	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
90	M	F	2:30-4:00	4	0	1	0	0	1	0	1	1	0	
130	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
12	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
52	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
92	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
132	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
18	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
58	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
98	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
138	H	F	2:30-4:00	1	0	1	0	0	3	0	1	1	0	
20	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
60	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
100	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
140	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
26	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
66	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
106	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
146	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
28	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
68	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
108	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	abrasion lff
148	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
34	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
74	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
114	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
154	H	F	2:30-4:00	4	0	1	0	0	3	0	1	1	0	
36	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
76	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
116	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0	
156	H	F	2:30-4:00	1	0	1	0	0	3	0	1	1	0	
				1=Normal					1=Normal					lff = left front foot
				4=Passive					3=Wet					

Manipulative Observations					Protocol number		PAO ACUTE							
Date	7/21/2015-7/29/15													
			Approach	Acoustic	Tail Pinch	Visual	Surface	Quantitative Data						
Animal ID	Condition	Sex	Response	Response	Response	Placing	Righting	Forelimb Grip		ForeAvg	Hindlimb Grip		HindAvg	
2	C	F	1	1	1	1	1	0.465	0.215	0.340	0.024	0.052	0.038	
42	L	F	1	1	1	1	1	0.290	0.220	0.255	0.019	0.025	0.022	
82	M	F	1	1	1	1	1	0.355	0.330	0.343	0.010	0.022	0.016	
122	H	F	1	1	1	1	1	0.280	0.385	0.333	0.022	0.017	0.020	
4	C	F	1	1	2	1	1	0.240	0.290	0.265	0.020	0.018	0.019	
44	L	F	1	1	1	1	1	0.420	0.235	0.328	0.029	0.013	0.021	
84	M	F	1	1	1	1	1	0.225	0.215	0.220	0.028	0.032	0.030	
124	H	F	1	1	1	1	1	0.220	0.295	0.258	0.015	0.022	0.019	
10	C	F	1	1	1	1	1	0.515	0.310	0.413	0.019	0.022	0.021	
50	L	F	1	1	1	1	1	0.250	0.445	0.348	0.015	0.015	0.015	
90	M	F	1	1	1	1	1	0.135	0.235	0.185	0.022	0.022	0.022	
130	H	F	1	1	1	1	1	0.450	0.130	0.290	0.018	0.010	0.014	
12	C	F	1	1	1	1	1	0.390	0.265	0.328	0.030	0.026	0.028	
52	L	F	1	1	1	1	1	0.415	0.110	0.263	0.021	0.010	0.016	
92	M	F	1	1	1	1	1	0.250	0.260	0.255	0.027	0.017	0.022	
132	H	F	1	1	1	1	1	0.325	0.235	0.280	0.024	0.016	0.020	
18	C	F	1	1	1	1	1	0.510	0.305	0.408	0.011	0.010	0.011	
58	L	F	1	1	1	1	1	0.290	0.120	0.205	0.026	0.015	0.021	
98	M	F	1	1	1	1	1	0.365	0.160	0.263	0.026	0.032	0.029	
138	H	F	1	1	1	1	1	0.335	0.210	0.273	0.024	0.020	0.022	
20	C	F	1	1	1	1	1	0.205	0.225	0.215	0.020	0.017	0.019	
60	L	F	1	1	1	1	1	0.390	0.205	0.298	0.018	0.023	0.021	
100	M	F	1	1	1	1	1	0.155	0.275	0.215	0.015	0.018	0.017	
140	H	F	1	1	1	1	1	0.240	0.230	0.235	0.018	0.015	0.017	
26	C	F	1	1	1	1	1	0.310	0.255	0.283	0.014	0.017	0.016	
66	L	F	1	1	1	1	1	0.290	0.220	0.255	0.020	0.028	0.024	
106	M	F	1	1	1	1	1	0.230	0.235	0.233	0.013	0.019	0.016	
146	H	F	1	1	1	1	1	0.395	0.280	0.338	0.043	0.017	0.030	
28	C	F	1	1	1	1	1	0.320	0.295	0.308	0.022	0.020	0.021	
68	L	F	1	1	1	1	1	0.415	0.225	0.320	0.028	0.021	0.025	
108	M	F	1	1	1	1	1	0.385	0.265	0.325	0.014	0.021	0.018	
148	H	F	1	1	1	1	1	0.270	0.334	0.302	0.033	0.027	0.030	
34	C	F	1	1	1	1	1	0.215	0.535	0.375	0.014	0.200	0.107	
74	L	F	1	1	1	1	1	0.375	0.140	0.258	0.019	0.017	0.018	
114	M	F	1	1	1	1	1	0.325	0.300	0.313	0.026	0.031	0.029	
154	H	F	1	1	1	1	1	0.305	0.240	0.273	0.013	0.023	0.018	
36	C	F	1	1	1	1	1	0.540	0.460	0.500	0.016	0.054	0.035	
76	L	F	1	1	1	1	1	0.415	0.235	0.325	0.035	0.017	0.026	
116	M	F	1	1	1	1	1	0.455	0.330	0.393	0.015	0.011	0.013	
156	H	F	1	1	1	1	1	0.400	0.315	0.358	0.020	0.037	0.029	
								Grip Units=kg (peak value)						

## Female FOB Observations for Acute PAO Exposure Study: Recovery Cohort

Cage side Observations				Protocol number		PAO DELAY								
Date	8/3/15-8/11/15													
		Body	Observational									Clonic	Seizure	Palpebral
Animal ID	Condition	Sex	Weight	Time	Posture	Tremor	Severity	Induction	Spasm	Location	Seizures	Convulsions	Severity	Closure
6	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
46	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
86	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
126	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
8	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
48	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
88	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
128	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
14	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
54	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
94	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
134	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
16	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
56	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
96	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
136	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
22	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
62	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
102	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
142	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
24	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
64	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
104	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
144	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
30	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
70	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
110	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
150	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
32	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
72	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
112	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
152	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
38	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
78	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
118	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
158	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
40	C	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
80	L	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
120	M	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
160	H	F	ON FILE	1:00-2:30	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
C=control=0 mg/m <sup>3</sup> ; L=low=300 mg/m <sup>3</sup> , M=mid=intermediate=500 mg/m <sup>3</sup> ; H=high=1000 mg/m <sup>3</sup>														

[illegible]



## Male Motor Activity Observations for Acute PAO Exposure Study: Acute Cohort

Motor Activity Measurements				Protocol number		PAO ACUTE					
Date	7/21/2015-7/29/15			Sex		Male					
Session	Subject	Condition	Sex	Total	Actual	Average	Actual	Total Resting	Actual Resting	Activity	Total
ID	ID			Distance	Distance	Speed	Speed	Time	Time	Time	Rears
PAO_A_1_M	1	C	M	7039.6	703.96	37.28125	3.73	11039	1103.90	696.10	29
PAO_A_1_M	41	L	M	12245.1	1224.51	39.02367	3.90	9738	973.80	826.20	101
PAO_A_1_M	81	M	M	6689.2	668.92	37.67309	3.77	11670	1167.00	633.00	22
PAO_A_1_M	121	H	M	7165.4	716.54	36.11302	3.61	12900	1290.00	510.00	448
PAO_A_1_M	3	C	M	12974.6	1297.46	32.79229	3.28	8333	833.30	966.70	72
PAO_A_1_M	43	L	M	13180.5	1318.05	36.47505	3.65	9750	975.00	825.00	58
PAO_A_1_M	83	M	M	8484.7	848.47	33.43058	3.34	7936	793.60	1006.40	33
PAO_A_1_M	123	H	M	5039.6	503.96	27.84647	2.78	8445	844.50	955.50	32
PAO_A_2_M	49	L	M	11139.1	1113.91	40.81934	4.08	10026	1002.60	797.40	53
PAO_A_2_M	89	M	M	3167.6	316.76	30.7191	3.07	12719	1271.90	528.10	9
PAO_A_2_M	129	H	M	2597.2	259.72	40.89052	4.09	5861	586.10	1213.90	9
PAO_A_2_M	11	C	M	15396.7	1539.67	42.04819	4.20	5489	548.90	1251.10	103
PAO_A_2_M	51	L	M	14972.6	1497.26	31.7029	3.17	8110	811.00	989.00	121
PAO_A_2_M	91	M	M	9525.7	952.57	37.01103	3.70	8935	893.50	906.50	46
PAO_A_2_M	131	H	M	2263.6	226.36	32.47675	3.25	5763	576.30	1223.70	15
PAO_A_2_M	9	C	M	7059.6	705.96	28.87795	2.89	9504	950.40	849.60	42
PAO_A_3_M	97	M	M	12241.9	1224.19	37.51265	3.75	7467	746.70	1053.30	30
PAO_A_3_M	137	H	M	4377.1	437.71	35.06586	3.51	4588	458.80	1341.20	21
PAO_A_3_M	19	C	M	14008.8	1400.88	39.59033	3.96	7937	793.70	1006.30	55
PAO_A_3_M	59	L	M	14147.4	1414.74	40.48054	4.05	8717	871.70	928.30	157
PAO_A_3_M	99	M	M	13141.4	1314.14	31.43943	3.14	6863	686.30	1113.70	57
PAO_A_3_M	139	H	M	9509.3	950.93	37.61703	3.76	11276	1127.60	672.40	25
PAO_A_3_M	17	C	M	5456	545.60	28.62075	2.86	12028	1202.80	597.20	24
PAO_A_3_M	57	L	M	8254.2	825.42	33.28231	3.33	7495	749.50	1050.50	48
PAO_A_4_M	145	H	M	2045.7	204.57	27.5663	2.76	7170	717.00	1083.00	0
PAO_A_4_M	27	C	M	14191	1419.10	42.6737	4.27	9124	912.40	887.60	103
PAO_A_4_M	67	L	M	18591.8	1859.18	45.10318	4.51	6906	690.60	1109.40	83
PAO_A_4_M	107	M	M	6397.8	639.78	38.36806	3.84	11975	1197.50	602.50	21
PAO_A_4_M	147	H	M	4592.4	459.24	29.26053	2.93	10237	1023.70	776.30	8
PAO_A_4_M	25	C	M	29389.8	2938.98	40.25064	4.03	4106	410.60	1389.40	159
PAO_A_4_M	65	L	M	11852	1185.20	34.52329	3.45	9953	995.30	804.70	65
PAO_A_4_M	105	M	M	5672.7	567.27	25.99046	2.60	12157	1215.70	584.30	36
PAO_A_5_M	35	C	M	15744	1574.40	40.413	4.04	8869	886.90	913.10	55
PAO_A_5_M	75	L	M	13442.3	1344.23	43.02953	4.30	10317	1031.70	768.30	67
PAO_A_5_M	115	M	M	8886.2	888.62	43.29572	4.33	10119	1011.90	788.10	20
PAO_A_5_M	155	H	M	7276.9	727.69	43.92476	4.39	7350	735.00	1065.00	42
PAO_A_5_M	33	C	M	11086.7	1108.67	34.75419	3.48	10537	1053.70	746.30	47
PAO_A_5_M	73	L	M	8914.4	891.44	35.19098	3.52	11693	1169.30	630.70	31
PAO_A_5_M	113	M	M	9146	914.60	35.76068	3.58	9266	926.60	873.40	22
PAO_A_5_M	153	H	M	5808.3	580.83	29.12083	2.91	10125	1012.50	787.50	16
		Units		cm	cm		cm/sec	sec	sec of 1800	sec of 1800	#
		C=control=0 mg/m^3; L=low=300 mg/m^3,									
		M=mid=intermediate=500 mg/m^3; H=high=1000 mg/m^3									

Subject	Condition	Sex	1st 10 Perimeter	1st 10 Center	Total	% in	Fine	Ambulatory	Resting Time	Perimeter	Chamber
ID			Beam Breaks	Beam Breaks	Beam Breaks	Center	Total	Total	Parameter	Settings	
1	C	M	393	236	629.00	37.52	242	1321	4 sec	X = 3, Y = 3	1
41	L	M	654	429	1083.00	39.61	337	2424	4 sec	X = 3, Y = 3	2
81	M	M	495	305	800.00	38.13	286	1306	4 sec	X = 3, Y = 3	3
121	H	M	488	337	825.00	40.85	282	1220	4 sec	X = 3, Y = 3	4
3	C	M	583	684	1267.00	53.99	322	2741	4 sec	X = 3, Y = 3	5
43	L	M	805	775	1580.00	49.05	291	2717	4 sec	X = 3, Y = 3	6
83	M	M	592	432	1024.00	42.19	288	1797	4 sec	X = 3, Y = 3	7
123	H	M	538	237	775.00	30.58	225	1220	4 sec	X = 3, Y = 3	8
49	L	M	861	787	1648.00	47.75	246	2073	4 sec	X = 3, Y = 3	1
89	M	M	292	184	476.00	38.66	196	654	4 sec	X = 3, Y = 3	2
129	H	M	236	235	471.00	49.89	77	496	4 sec	X = 3, Y = 3	3
11	C	M	1195	830	2025.00	40.99	223	3007	4 sec	X = 3, Y = 3	4
51	L	M	798	643	1441.00	44.62	272	3298	4 sec	X = 3, Y = 3	5
91	M	M	613	845	1458.00	57.96	222	1988	4 sec	X = 3, Y = 3	6
131	H	M	222	225	447.00	50.34	60	455	4 sec	X = 3, Y = 3	7
9	C	M	597	662	1259.00	52.58	176	1588	4 sec	X = 3, Y = 3	8
97	M	M	594	292	886.00	32.96	233	2428	4 sec	X = 3, Y = 3	1
137	H	M	359	241	600.00	40.17	184	826	4 sec	X = 3, Y = 3	2
19	C	M	356	1035	1391.00	74.41	220	2685	4 sec	X = 3, Y = 3	3
59	L	M	668	603	1271.00	47.44	195	2741	4 sec	X = 3, Y = 3	4
99	M	M	645	808	1453.00	55.61	212	2738	4 sec	X = 3, Y = 3	5
139	H	M	564	497	1061.00	46.84	316	1801	4 sec	X = 3, Y = 3	6
17	C	M	442	370	812.00	45.57	275	1166	4 sec	X = 3, Y = 3	7
57	L	M	389	125	514.00	24.32	267	1698	4 sec	X = 3, Y = 3	8
145	H	M	173	116	289.00	40.14	92	410	4 sec	X = 3, Y = 3	1
27	C	M	723	817	1540.00	53.05	179	2676	4 sec	X = 3, Y = 3	2
67	L	M	1055	1119	2174.00	51.47	207	3547	4 sec	X = 3, Y = 3	3
107	M	M	437	389	826.00	47.09	217	1008	4 sec	X = 3, Y = 3	4
147	H	M	249	363	612.00	59.31	100	874	4 sec	X = 3, Y = 3	5
25	C	M	1107	1512	2619.00	57.73	254	5965	4 sec	X = 3, Y = 3	6
65	L	M	563	638	1201.00	53.12	281	2376	4 sec	X = 3, Y = 3	7
105	M	M	421	436	857.00	50.88	182	1307	4 sec	X = 3, Y = 3	8
35	C	M	860	739	1599.00	46.22	253	2955	4 sec	X = 3, Y = 3	1
75	L	M	746	777	1523.00	51.02	253	2465	4 sec	X = 3, Y = 3	2
115	M	M	570	689	1259.00	54.73	300	1583	4 sec	X = 3, Y = 3	3
155	H	M	468	414	882.00	46.94	206	1280	4 sec	X = 3, Y = 3	4
33	C	M	424	503	927.00	54.26	209	2213	4 sec	X = 3, Y = 3	5
73	L	M	491	324	815.00	39.75	268	1721	4 sec	X = 3, Y = 3	6
113	M	M	852	538	1390.00	38.71	226	1801	4 sec	X = 3, Y = 3	7
153	H	M	604	407	1011.00	40.26	208	1247	4 sec	X = 3, Y = 3	8
Units			#	#	#	%	#				

## Male Motor Activity Observations for Acute PAO Exposure Study: Recovery Cohort

Motor Activity Measurements				Protocol number		PAO DELAY					
Date	8/3/2015-8/11/2015										
Session	Subject	Condition	Sex	Total	Actual	Average	Actual	Total Resting	Actual Resting	Activity	Total
ID	ID			Distance	Distance	Speed	Speed	Time	Time	Time	Rears
PAO_D_R1_M	5	C	M	10962.00	1096.20	40.02	4.00	8485.00	848.50	951.50	48
PAO_D_R1_M	45	L	M	18874.10	1887.41	42.15	4.21	7868.00	786.80	1013.20	108
PAO_D_R1_M	85	M	M	13710.50	1371.05	43.07	4.31	10461.00	1046.10	753.90	61
PAO_D_R1_M	125	H	M	16412.40	1641.24	42.30	4.23	6567.00	656.70	1143.30	120
PAO_D_R1_M	7	C	M	12383.60	1238.36	34.31	3.43	9519.00	951.90	848.10	56
PAO_D_R1_M	47	L	M	13063.80	1306.38	36.34	3.63	8806.00	880.60	919.40	87
PAO_D_R1_M	87	M	M	12763.00	1276.30	34.15	3.41	9051.00	905.10	894.90	70
PAO_D_R1_M	127	H	M	13132.40	1313.24	29.66	2.97	7942.00	794.20	1005.80	58
PAO_D_R2_M	53	L	M	16635.70	1663.57	42.07	4.21	7899.00	789.90	1010.10	52
PAO_D_R2_M	93	M	M	15723.30	1572.33	40.58	4.06	9346.00	934.60	865.40	136
PAO_D_R2_M	133	H	M	19844.00	1984.40	42.02	4.20	7608.00	760.80	1039.20	119
PAO_D_R2_M	15	C	M	21067.60	2106.76	44.22	4.42	6368.00	636.80	1163.20	128
PAO_D_R2_M	55	L	M	14234.60	1423.46	33.78	3.38	8617.00	861.70	938.30	63
PAO_D_R2_M	95	M	M	17126.50	1712.65	35.76	3.58	7381.00	738.10	1061.90	120
PAO_D_R2_M	135	H	M	18783.70	1878.37	34.70	3.47	6159.00	615.90	1184.10	82
PAO_D_R2_M	13	C	M	9095.70	909.57	30.80	3.08	10589.00	1058.90	741.10	47
PAO_D_R3_M	101	M	M	8194.20	819.42	39.84	3.98	10204.00	1020.40	779.60	31
PAO_D_R3_M	141	H	M	10096.20	1009.62	42.07	4.21	10654.00	1065.40	734.60	48
PAO_D_R3_M	23	C	M	13656.70	1365.67	41.93	4.19	6802.00	680.20	1119.80	65
PAO_D_R3_M	63	L	M	19268.70	1926.87	44.98	4.50	9240.00	924.00	876.00	114
PAO_D_R3_M	103	M	M	17187.60	1718.76	34.13	3.41	6472.00	647.20	1152.80	100
PAO_D_R3_M	143	H	M	25018.00	2501.80	40.69	4.07	5947.00	594.70	1205.30	108
PAO_D_R3_M	21	C	M	13535.00	1353.50	41.35	4.13	7315.00	731.50	1068.50	61
PAO_D_R3_M	61	L	M	9018.50	901.85	30.60	3.06	8137.00	813.70	986.30	48
PAO_D_R4_M	149	H	M	14487.40	1448.74	41.54	4.15	9735.00	973.50	826.50	65
PAO_D_R4_M	31	C	M	19076.00	1907.60	41.81	4.18	7964.00	796.40	1003.60	122
PAO_D_R4_M	71	L	M	28820.80	2882.08	46.17	4.62	5334.00	533.40	1266.60	156
PAO_D_R4_M	111	M	M	19544.50	1954.45	41.22	4.12	7113.00	711.30	1088.70	101
PAO_D_R4_M	151	H	M	16715.60	1671.56	33.43	3.34	6107.00	610.70	1189.30	133
PAO_D_R4_M	29	C	M	25867.10	2586.71	41.83	4.18	5360.00	536.00	1264.00	120
PAO_D_R4_M	69	L	M	21492.80	2149.28	38.63	3.86	5857.00	585.70	1214.30	121
PAO_D_R4_M	109	M	M	13353.80	1335.38	29.52	2.95	7119.00	711.90	1088.10	104
PAO_D_R5_M	39	C	M	9054.10	905.41	42.69	4.27	10911.00	1091.10	708.90	34
PAO_D_R5_M	79	L	M	13019.90	1301.99	45.04	4.50	10763.00	1076.30	723.70	75
PAO_D_R5_M	119	M	M	22112.20	2211.22	45.18	4.52	6534.00	653.40	1146.60	78
PAO_D_R5_M	159	H	M	18001.00	1800.10	43.64	4.36	8230.00	823.00	977.00	75
PAO_D_R5_M	37	C	M	13620.70	1362.07	34.86	3.49	8845.00	884.50	915.50	79
PAO_D_R5_M	77	L	M	19591.50	1959.15	40.97	4.10	6472.00	647.20	1152.80	80
PAO_D_R5_M	117	M	M	17348.40	1734.84	39.52	3.95	8321.00	832.10	967.90	72
PAO_D_R5_M	157	H	M	14999.70	1499.97	28.50	2.85	5860.00	586.00	1214.00	89
		Units		cm	cm		cm/sec	sec	sec of 1800	sec of 1800	#
		C=control=0 mg/m^3; L=low=300 mg/m^3,									
		M=mid=intermediate=500 mg/m^3; H=high=1000 mg/m^3									



Subject	Condition	Sex	1st 10 Perimeter	1st 10 Center	Total	% in	Fine	Ambulatory	Resting Time	Perimeter	Chamber
ID			Beam Breaks	Beam Breaks	Beam Breaks	Center	Total	Total	Parameter	Settings	
5	C	M	586	477	1063.00	44.87	268	1978	4 sec	X = 3 and Y = 3	1
45	L	M	747	1043	1790.00	58.27	266	3588	4 sec	X = 3 and Y = 3	2
85	M	M	778	751	1529.00	49.12	211	2612	4 sec	X = 3 and Y = 3	3
125	H	M	1029	876	1905.00	45.98	226	3052	4 sec	X = 3 and Y = 3	4
7	C	M	943	775	1718.00	45.11	254	2622	4 sec	X = 3 and Y = 3	5
47	L	M	628	449	1077.00	41.69	208	2609	4 sec	X = 3 and Y = 3	6
87	M	M	896	672	1568.00	42.86	228	2613	4 sec	X = 3 and Y = 3	7
127	H	M	535	748	1283.00	58.30	239	2712	4 sec	X = 3 and Y = 3	8
53	L	M	1104	929	2033.00	45.70	160	3134	4 sec	X = 3 and Y = 3	1
93	M	M	1048	981	2029.00	48.35	183	3190	4 sec	X = 3 and Y = 3	2
133	H	M	1143	974	2117.00	46.01	285	3877	4 sec	X = 3 and Y = 3	3
15	C	M	817	1410	2227.00	63.31	230	3803	4 sec	X = 3 and Y = 3	4
55	L	M	525	873	1398.00	62.45	255	2776	4 sec	X = 3 and Y = 3	5
95	M	M	817	996	1813.00	54.94	234	3494	4 sec	X = 3 and Y = 3	6
135	H	M	1050	872	1922.00	45.37	241	3664	4 sec	X = 3 and Y = 3	7
13	C	M	483	779	1262.00	61.73	199	1970	4 sec	X = 3 and Y = 3	8
101	M	M	728	404	1132.00	35.69	207	1552	4 sec	X = 3 and Y = 3	1
141	H	M	722	821	1543.00	53.21	196	1753	4 sec	X = 3 and Y = 3	2
23	C	M	922	884	1806.00	48.95	220	2680	4 sec	X = 3 and Y = 3	3
63	L	M	1235	809	2044.00	39.58	189	3697	4 sec	X = 3 and Y = 3	4
103	M	M	746	812	1558.00	52.12	262	3522	4 sec	X = 3 and Y = 3	5
143	H	M	1249	947	2196.00	43.12	252	4936	4 sec	X = 3 and Y = 3	6
21	C	M	896	1037	1933.00	53.65	197	2625	4 sec	X = 3 and Y = 3	7
61	L	M	631	693	1324.00	52.34	177	1997	4 sec	X = 3 and Y = 3	8
149	H	M	806	862	1668.00	51.68	238	2709	4 sec	X = 3 and Y = 3	1
31	C	M	767	1332	2099.00	63.46	216	3552	4 sec	X = 3 and Y = 3	2
71	L	M	1131	1619	2750.00	58.87	260	5759	4 sec	X = 3 and Y = 3	3
111	M	M	1189	1147	2336.00	49.10	240	3679	4 sec	X = 3 and Y = 3	4
151	H	M	640	921	1561.00	59.00	295	3347	4 sec	X = 3 and Y = 3	5
29	C	M	827	1406	2233.00	62.96	234	4882	4 sec	X = 3 and Y = 3	6
69	L	M	923	870	1793.00	48.52	238	4248	4 sec	X = 3 and Y = 3	7
109	M	M	505	841	1346.00	62.48	242	2869	4 sec	X = 3 and Y = 3	8
39	C	M	524	770	1294.00	59.51	192	1599	4 sec	X = 3 and Y = 3	1
79	L	M	848	812	1660.00	48.92	263	2329	4 sec	X = 3 and Y = 3	2
119	M	M	615	1256	1871.00	67.13	285	3861	4 sec	X = 3 and Y = 3	3
159	H	M	524	938	1462.00	64.16	206	3118	4 sec	X = 3 and Y = 3	4
37	C	M	786	695	1481.00	46.93	245	2884	4 sec	X = 3 and Y = 3	5
77	L	M	974	976	1950.00	50.05	221	3646	4 sec	X = 3 and Y = 3	6
117	M	M	847	1219	2066.00	59.00	225	3262	4 sec	X = 3 and Y = 3	7
157	H	M	836	871	1707.00	51.03	248	3273	4 sec	X = 3 and Y = 3	8
Units			#	#	#	%	#				

## Female Motor Activity Observations for Acute PAO Exposure Study: Acute Cohort

Motor Activity Measurements				Protocol number		PAO ACUTE					
Date	7/21/2015-7/29/15										
Session	Subject	Condition	Sex	Total	Actual	Average	Actual	Total Resting	Actual Resting	Activity	Total
ID	ID			Distance	Distance	Speed	Speed	Time	Time	Time	Rears
PAO_A_R1_F	2	C	F	15405.2	1540.52	36.53292727	3.65	9041	904.10	895.90	92
PAO_A_R1_F	42	L	F	8158.3	815.83	35.19577373	3.52	5546	554.60	1245.40	59
PAO_A_R1_F	82	M	F	1343	134.30	36.37939915	3.64	5463	546.30	1253.70	3
PAO_A_R1_F	122	H	F	2103.2	210.32	34.3017192	3.43	8729	872.90	927.10	24
PAO_A_R1_F	4	C	F	10315.4	1031.54	29.46541967	2.95	7589	758.90	1041.10	86
PAO_A_R1_F	44	L	F	16012.5	1601.25	32.45140459	3.25	7252	725.20	1074.80	117
PAO_A_R1_F	84	M	F	3331.8	333.18	28.18947369	2.82	8103	810.30	989.70	10
PAO_A_R1_F	124	H	F	1840.3	184.03	21.13874348	2.11	8928	892.80	907.20	11
PAO_A_R2_F	50	L	F	15732.9	1573.29	39.20014552	3.92	8042	804.20	995.80	83
PAO_A_R2_F	90	M	F	822.4	82.24	11.82929936	1.18	9765	976.50	823.50	1
PAO_A_R2_F	130	H	F	2130.9	213.09	25.47458431	2.55	7385	738.50	1061.50	3
PAO_A_R2_F	12	C	F	6831.9	683.19	35.71905172	3.57	10965	1096.50	703.50	58
PAO_A_R2_F	52	L	F	7963.1	796.31	28.01519797	2.80	10170	1017.00	783.00	32
PAO_A_R2_F	92	M	F	10331.7	1033.17	30.83377148	3.08	10233	1023.30	776.70	60
PAO_A_R2_F	132	H	F	3168.7	316.87	30.27486631	3.03	9619	961.90	838.10	6
PAO_A_R2_F	10	C	F	10420.3	1042.03	27.11489649	2.71	9338	933.80	866.20	99
PAO_A_R3_F	98	M	F	2028.6	202.86	33.78867925	3.38	3575	357.50	1442.50	4
PAO_A_R3_F	138	H	F	4065.7	406.57	43.15555556	4.32	5952	595.20	1204.80	14
PAO_A_R3_F	20	C	F	19100.7	1910.07	37.89195538	3.79	7441	744.10	1055.90	135
PAO_A_R3_F	60	L	F	14333.3	1433.33	37.57707007	3.76	7755	775.50	1024.50	113
PAO_A_R3_F	100	M	F	1665.7	166.57	23.84454548	2.38	9195	919.50	880.50	10
PAO_A_R3_F	140	H	F	1524.3	152.43	27.55170069	2.76	6565	656.50	1143.50	8
PAO_A_R3_F	18	C	F	7697.8	769.78	33.48764205	3.35	7840	784.00	1016.00	31
PAO_A_R3_F	58	L	F	12100.9	1210.09	24.26775029	2.43	6519	651.90	1148.10	152
PAO_A_R4_F	146	H	F	3947.7	394.77	37.33419849	3.73	10063	1006.30	793.70	6
PAO_A_R4_F	28	C	F	8591.2	859.12	36.05417771	3.61	10280	1028.00	772.00	49
PAO_A_R4_F	68	L	F	17091.7	1709.17	37.08767361	3.71	7594	759.40	1040.60	108
PAO_A_R4_F	108	M	F	6404.7	640.47	38.5516941	3.86	7190	719.00	1081.00	40
PAO_A_R4_F	148	H	F	8930.9	893.09	30.37304348	3.04	8479	847.90	952.10	30
PAO_A_R4_F	26	C	F	12651.3	1265.13	34.2995732	3.43	9595	959.50	840.50	69
PAO_A_R4_F	66	L	F	8384	838.40	33.60537135	3.36	12271	1227.10	572.90	46
PAO_A_R4_F	106	M	F	7672.1	767.21	27.67178452	2.77	6618	661.80	1138.20	66
PAO_A_R5_F	36	C	F	12891.1	1289.11	37.41243713	3.74	9635	963.50	836.50	65
PAO_A_R5_F	76	L	F	19785.3	1978.53	39.62563878	3.96	6368	636.80	1163.20	169
PAO_A_R5_F	116	M	F	3659.5	365.95	39.62905405	3.96	9953	995.30	804.70	11
PAO_A_R5_F	156	H	F	2115.8	211.58	39.91173021	3.99	5133	513.30	1286.70	7
PAO_A_R5_F	34	C	F	10574.6	1057.46	29.01431947	2.90	9512	951.20	848.80	105
PAO_A_R5_F	74	L	F	17464.2	1746.42	34.27399689	3.43	7833	783.30	1016.70	107
PAO_A_R5_F	114	M	F	9693.6	969.36	34.24628996	3.42	8998	899.80	900.20	32
PAO_A_R5_F	154	H	F	1824.8	182.48	28.10670558	2.81	3244	324.40	1475.60	4
		Units		cm	cm		cm/sec	sec	sec of 1800	sec of 1800	#
		C=control=0 mg/m^3; L=low=300 mg/m^3,									
		M=mid=intermediate=500 mg/m^3; H=high=1000 mg/m^3									

Subject	Condition	Sex	1st 10 Perimeter	1st 10 Center	Total	% in	Fine	Ambulatory	Resting Time	Perimeter	Chamber
ID			Beam Breaks	Beam Breaks	Beam Breaks	Center	Total	Total	Parameter	Settings	
2	C	F	886	870	1756.00	49.54	222	3341	4 sec	X = 3 and Y = 3	1
42	L	F	878	505	1383.00	36.51	256	1826	4 sec	X = 3 and Y = 3	2
82	M	F	66	67	133.00	50.38	72	279	4 sec	X = 3 and Y = 3	3
122	H	F	163	160	323.00	49.54	64	411	4 sec	X = 3 and Y = 3	4
4	C	F	878	519	1397.00	37.15	208	2365	4 sec	X = 3 and Y = 3	5
44	L	F	845	772	1617.00	47.74	251	3647	4 sec	X = 3 and Y = 3	6
84	M	F	233	159	392.00	40.56	167	634	4 sec	X = 3 and Y = 3	7
124	H	F	228	140	368.00	38.04	115	418	4 sec	X = 3 and Y = 3	8
50	L	F	835	537	1372.00	39.14	286	3325	4 sec	X = 3 and Y = 3	1
90	M	F	78	57	135.00	42.22	129	168	4 sec	X = 3 and Y = 3	2
130	H	F	283	68	351.00	19.37	150	465	4 sec	X = 3 and Y = 3	3
12	C	F	685	463	1148.00	40.33	170	1358	4 sec	X = 3 and Y = 3	4
52	L	F	442	495	937.00	52.83	268	1751	4 sec	X = 3 and Y = 3	5
92	M	F	805	610	1415.00	43.11	271	2297	4 sec	X = 3 and Y = 3	6
132	H	F	367	78	445.00	17.53	256	674	4 sec	X = 3 and Y = 3	7
10	C	F	865	500	1365.00	36.63	236	2529	4 sec	X = 3 and Y = 3	8
98	M	F	235	151	386.00	39.12	88	431	4 sec	X = 3 and Y = 3	1
138	H	F	446	325	771.00	42.15	90	788	4 sec	X = 3 and Y = 3	2
20	C	F	1087	850	1937.00	43.88	331	4163	4 sec	X = 3 and Y = 3	3
60	L	F	1080	783	1863.00	42.03	172	3009	4 sec	X = 3 and Y = 3	4
100	M	F	155	184	339.00	54.28	71	367	4 sec	X = 3 and Y = 3	5
140	H	F	194	104	298.00	34.90	70	341	4 sec	X = 3 and Y = 3	6
18	C	F	916	355	1271.00	27.93	209	1615	4 sec	X = 3 and Y = 3	7
58	L	F	587	509	1096.00	46.44	246	3058	4 sec	X = 3 and Y = 3	8
146	H	F	308	315	623.00	50.56	126	774	4 sec	X = 3 and Y = 3	1
28	C	F	646	450	1096.00	41.06	244	1810	4 sec	X = 3 and Y = 3	2
68	L	F	688	1071	1759.00	60.89	344	3401	4 sec	X = 3 and Y = 3	3
108	M	F	602	368	970.00	37.94	217	1235	4 sec	X = 3 and Y = 3	4
148	H	F	571	675	1246.00	54.17	219	1974	4 sec	X = 3 and Y = 3	5
26	C	F	585	583	1168.00	49.91	408	2783	4 sec	X = 3 and Y = 3	6
66	L	F	590	316	906.00	34.88	243	1773	4 sec	X = 3 and Y = 3	7
106	M	F	606	727	1333.00	54.54	252	1692	4 sec	X = 3 and Y = 3	8
36	C	F	843	784	1627.00	48.19	273	2590	4 sec	X = 3 and Y = 3	1
76	L	F	861	1112	1973.00	56.36	298	4227	4 sec	X = 3 and Y = 3	2
116	M	F	364	283	647.00	43.74	110	701	4 sec	X = 3 and Y = 3	3
156	H	F	180	210	390.00	53.85	71	405	4 sec	X = 3 and Y = 3	4
34	C	F	626	626	1252.00	50.00	284	2399	4 sec	X = 3 and Y = 3	5
74	L	F	958	964	1922.00	50.16	249	3790	4 sec	X = 3 and Y = 3	6
114	M	F	771	639	1410.00	45.32	181	1997	4 sec	X = 3 and Y = 3	7
154	H	F	182	87	269.00	32.34	73	383	4 sec	X = 3 and Y = 3	8
	Units		#	#	#	%	#				

## Female Motor Activity Observations for Acute PAO Exposure Study: Recovery Cohort

Motor Activity Measurements				Protocol number		PAO DELAY					
Date	8/3/15-8/11/15										
Session ID	Subject ID	Condition	Sex	Total Distance	Actual Distance	Average Speed	Actual Speed	Total Resting Time	Actual Resting Time	Activity Time	Total Rears
PAO_D_R1_F	6	C	F	15421.40	1542.14	38.43	3.84	8477.00	847.70	952.30	81
PAO_D_R1_F	46	L	F	16618.50	1661.85	39.61	3.96	9056.00	905.60	894.40	108
PAO_D_R1_F	86	M	F	24304.30	2430.43	39.73	3.97	6364.00	636.40	1163.60	147
PAO_D_R1_F	126	H	F	26714.90	2671.49	40.24	4.02	4991.00	499.10	1300.90	253
PAO_D_R1_F	8	C	F	16274.30	1627.43	29.75	2.98	5915.00	591.50	1208.50	180
PAO_D_R1_F	48	L	F	17493.00	1749.30	32.07	3.21	6614.00	661.40	1138.60	110
PAO_D_R1_F	88	M	F	17448.00	1744.80	31.54	3.15	5347.00	534.70	1265.30	129
PAO_D_R1_F	128	H	F	12709.90	1270.99	27.84	2.78	7477.00	747.70	1052.30	122
PAO_D_R2_F	54	L	F	16539.80	1653.98	38.01	3.80	8349.00	834.90	965.10	61
PAO_D_R2_F	94	M	F	17019.90	1701.99	39.28	3.93	8565.00	856.50	943.50	171
PAO_D_R2_F	134	H	F	15642.30	1564.23	38.45	3.84	8262.00	826.20	973.80	133
PAO_D_R2_F	16	C	F	11280.90	1128.09	39.19	3.92	4919.00	491.90	1308.10	55
PAO_D_R2_F	56	L	F	15625.10	1562.51	31.09	3.11	6524.00	652.40	1147.60	124
PAO_D_R2_F	96	M	F	14115.60	1411.56	36.46	3.65	7975.00	797.50	1002.50	81
PAO_D_R2_F	136	H	F	9662.20	966.22	35.54	3.55	9033.00	903.30	896.70	40
PAO_D_R2_F	14	C	F	9026.60	902.66	25.96	2.60	9237.00	923.70	876.30	100
PAO_D_R3_F	102	M	F	12718.30	1271.83	35.29	3.53	8652.00	865.20	934.80	75
PAO_D_R3_F	142	H	F	22165.20	2216.52	39.99	4.00	6794.00	679.40	1120.60	160
PAO_D_R3_F	24	C	F	25503.10	2550.31	38.86	3.89	5433.00	543.30	1256.70	171
PAO_D_R3_F	64	L	F	15262.30	1526.23	40.49	4.05	7987.00	798.70	1001.30	98
PAO_D_R3_F	104	M	F	17502.50	1750.25	29.96	3.00	5595.00	559.50	1240.50	143
PAO_D_R3_F	144	H	F	19292.50	1929.25	35.02	3.50	5819.00	581.90	1218.10	145
PAO_D_R3_F	22	C	F	19221.60	1922.16	33.85	3.39	6702.00	670.20	1129.80	108
PAO_D_R3_F	62	L	F	13087.20	1308.72	27.50	2.75	6536.00	653.60	1146.40	141
PAO_D_R4_F	150	H	F	13981.40	1398.14	36.67	3.67	9069.00	906.90	893.10	76
PAO_D_R4_F	32	C	F	14523.60	1452.36	37.06	3.71	8295.00	829.50	970.50	93
PAO_D_R4_F	72	L	F	11674.50	1167.45	36.62	3.66	9718.00	971.80	828.20	49
PAO_D_R4_F	112	M	F	18379.30	1837.93	38.69	3.87	7456.00	745.60	1054.40	85
PAO_D_R4_F	152	H	F	11618.60	1161.86	31.00	3.10	8232.00	823.20	976.80	76
PAO_D_R4_F	30	C	F	18959.70	1895.97	33.74	3.37	6524.00	652.40	1147.60	102
PAO_D_R4_F	70	L	F	13565.30	1356.53	31.16	3.12	6988.00	698.80	1101.20	104
PAO_D_R4_F	110	M	F	14375.60	1437.56	30.51	3.05	7042.00	704.20	1095.80	89
PAO_D_R5_F	40	C	F	17039.90	1703.99	41.68	4.17	9827.00	982.70	817.30	80
PAO_D_R5_F	80	L	F	21363.10	2136.31	39.75	3.98	6685.00	668.50	1131.50	164
PAO_D_R5_F	120	M	F	21063.40	2106.34	41.22	4.12	4986.00	498.60	1301.40	74
PAO_D_R5_F	160	H	F	23301.40	2330.14	39.04	3.90	5422.00	542.20	1257.80	177
PAO_D_R5_F	38	C	F	13219.70	1321.97	30.33	3.03	7479.00	747.90	1052.10	93
PAO_D_R5_F	78	L	F	17561.20	1756.12	35.27	3.53	7380.00	738.00	1062.00	84
PAO_D_R5_F	118	M	F	16358.50	1635.85	32.01	3.20	7214.00	721.40	1078.60	85
PAO_D_R5_F	158	H	F	13397.20	1339.72	28.02	2.80	7003.00	700.30	1099.70	148
		Units		cm	cm		cm/sec	sec	sec of 1800	sec of 1800	#
		C=control=0 mg/m^3; L=low=300 mg/m^3,									
		M=mid=intermediate=500 mg/m^3; H=high=1000 mg/m^3									

Subject	Condition	Sex	1st 10 Perimeter	1st 10 Center	Total	% in	Fine	Ambulatory	Resting Time	Perimeter	Chamber
ID			Beam Breaks	Beam Breaks	Beam Breaks	Center	Total	Total	Parameter	Settings	
6	C	F	1220	926	2146.00	43.15	302	3254	4 sec	X = 3 and Y = 3	1
46	L	F	1310	1260	2570.00	49.03	231	3488	4 sec	X = 3 and Y = 3	2
86	M	F	1488	1247	2735.00	45.59	240	5271	4 sec	X = 3 and Y = 3	3
126	H	F	1542	1278	2820.00	45.32	257	5728	4 sec	X = 3 and Y = 3	4
8	C	F	1010	846	1856.00	45.58	324	3805	4 sec	X = 3 and Y = 3	5
48	L	F	1066	857	1923.00	44.57	195	3938	4 sec	X = 3 and Y = 3	6
88	M	F	1143	810	1953.00	41.47	221	4023	4 sec	X = 3 and Y = 3	7
128	H	F	727	597	1324.00	45.09	299	2911	4 sec	X = 3 and Y = 3	8
54	L	F	878	632	1510.00	41.85	282	3360	4 sec	X = 3 and Y = 3	1
94	M	F	1114	819	1933.00	42.37	262	3556	4 sec	X = 3 and Y = 3	2
134	H	F	893	600	1493.00	40.19	257	3251	4 sec	X = 3 and Y = 3	3
16	C	F	1047	753	1800.00	41.83	206	2387	4 sec	X = 3 and Y = 3	4
56	L	F	898	701	1599.00	43.84	324	3456	4 sec	X = 3 and Y = 3	5
96	M	F	1257	809	2066.00	39.16	229	2999	4 sec	X = 3 and Y = 3	6
136	H	F	1024	548	1572.00	34.86	244	1919	4 sec	X = 3 and Y = 3	7
14	C	F	685	403	1088.00	37.04	280	2217	4 sec	X = 3 and Y = 3	8
102	M	F	980	914	1894.00	48.26	249	2709	4 sec	X = 3 and Y = 3	1
142	H	F	1000	1296	2296.00	56.45	300	4789	4 sec	X = 3 and Y = 3	2
24	C	F	1510	1156	2666.00	43.36	289	5577	4 sec	X = 3 and Y = 3	3
64	L	F	1176	661	1837.00	35.98	247	3169	4 sec	X = 3 and Y = 3	4
104	M	F	834	554	1388.00	39.91	302	3919	4 sec	X = 3 and Y = 3	5
144	H	F	1147	1007	2154.00	46.75	246	4154	4 sec	X = 3 and Y = 3	6
22	C	F	1056	848	1904.00	44.54	242	4170	4 sec	X = 3 and Y = 3	7
62	L	F	1100	714	1814.00	39.36	281	3179	4 sec	X = 3 and Y = 3	8
150	H	F	843	745	1588.00	46.91	330	2785	4 sec	X = 3 and Y = 3	1
32	C	F	687	564	1251.00	45.08	193	3004	4 sec	X = 3 and Y = 3	2
72	L	F	825	678	1503.00	45.11	347	2463	4 sec	X = 3 and Y = 3	3
112	M	F	1278	1077	2355.00	45.73	274	3422	4 sec	X = 3 and Y = 3	4
152	H	F	633	421	1054.00	39.94	264	2502	4 sec	X = 3 and Y = 3	5
30	C	F	1250	1056	2306.00	45.79	246	4196	4 sec	X = 3 and Y = 3	6
70	L	F	810	668	1478.00	45.20	273	3008	4 sec	X = 3 and Y = 3	7
110	M	F	936	647	1583.00	40.87	261	3216	4 sec	X = 3 and Y = 3	8
40	C	F	924	755	1679.00	44.97	236	3594	4 sec	X = 3 and Y = 3	1
80	L	F	830	609	1439.00	42.32	235	4566	4 sec	X = 3 and Y = 3	2
120	M	F	1137	1134	2271.00	49.93	243	3989	4 sec	X = 3 and Y = 3	3
160	H	F	1044	1368	2412.00	56.72	293	4681	4 sec	X = 3 and Y = 3	4
38	C	F	882	587	1469.00	39.96	373	2916	4 sec	X = 3 and Y = 3	5
78	L	F	965	805	1770.00	45.48	246	3712	4 sec	X = 3 and Y = 3	6
118	M	F	1080	704	1784.00	39.46	268	3600	4 sec	X = 3 and Y = 3	7
158	H	F	747	624	1371.00	45.51	262	3206	4 sec	X = 3 and Y = 3	8
Units			#	#	#	%	#				

## APPENDIX E. ACUTE EXPOSURE STUDY IN-LIFE WEIGHT DATA

### Male Body Weight Measurements for PAO Acute Exposure Study

Animal	Sex:	Male	Group:	Control		Units:	g		
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
1	168.12	174.23	172.09						
3	171.18	174.86	177.60						
5	181.77	183.40	186.54	185.22	191.75	205.06	207.36	209.91	215.85
7	181.03	184.03	186.55	189.61	196.32	205.84	208.33	213.86	215.53
9	161.64	162.30	169.91	167.89					
11	185.12	186.88	192.21	194.48					
13	201.08	204.11	211.73	214.85	218.06	230.72	233.09	235.18	241.22
15	181.73	186.06	192.57	194.63	197.87	211.78	213.86	217.68	221.52
17	169.70	174.79	177.21	185.81	185.86				
19	165.41	169.55	175.81	182.58	183.59				
21	180.70	184.45	188.42	195.19	197.38	208.22	210.58	218.09	221.57
23	172.33	174.66	178.26	185.46	186.81	198.97	201.96	202.83	210.69
25	168.53	173.16	178.03	180.05	185.91	196.47	200.64	202.13	
27	181.17	181.26	186.87	190.16	197.21	204.39	209.68	207.15	
29	170.70	174.08	178.51	184.60	192.29	203.40	208.96	208.88	212.07
31	168.26	170.87	174.87	179.51	184.53	194.42	201.23	200.84	203.47
33	162.50	161.77	167.64	174.07	179.52	191.44	195.87	199.47	198.38
35	174.29	176.83	181.27	185.58	192.17	202.83	204.35	209.95	209.79
37	160.80	162.45	168.47	173.71	179.56	192.45	196.17	200.85	201.86
39	181.67	183.80	189.38	191.63	198.53	209.04	213.00	218.49	216.54

Animal	Sex:	Male	Group:	Control		Units:	g		
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
1									
3									
5	217.31	225.90	215.22						
7	217.08	224.21	217.28						
9									
11									
13	247.21	254.00	258.81	244.87					
15	223.79	232.33	234.12	224.71					
17									
19									
21	210.94	235.09	237.90	241.91	226.63				
23	210.92	219.67	221.98	223.53	216.67				
25									
27									
29	214.00	222.15	227.14	225.85	230.71	232.74	239.55	229.06	
31	206.83	217.17	221.08	220.90	225.39	227.84	234.90	227.44	
33									
35									
37	204.02	214.15	215.57	218.67	221.73	223.26	230.15	232.86	223.11
39	219.62	225.11	228.77	231.44	232.41	235.08	243.09	243.39	237.09

Animal	Sex:	Male	Group:	Low		Units:	g		
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
41	165.60	167.59	169.31						
43	177.79	184.11	186.60						
45	178.94	184.10	186.17	190.34	192.47	179.75	199.51	201.77	205.19
47	181.54	182.84	187.03	187.28	189.95	197.89	201.85	202.21	203.51
49	159.67	162.21	168.06	166.08					
51	188.36	194.69	198.34	198.18					
53	171.18	172.20	177.11	178.00	180.44	189.03	191.49	195.25	199.93
55	179.78	185.95	190.39	193.44	194.48	210.14	216.06	217.44	222.47
57	179.63	185.42	190.49	195.19	196.11				
59	179.43	185.81	192.16	195.80	192.64				
61	163.06	167.79	173.78	178.38	178.17	179.04	183.10	187.93	192.66
63	162.17	164.98	170.61	171.67	173.80	182.99	187.23	190.13	195.06
65	177.92	180.63	182.05	187.87	190.52	199.61	204.10	206.33	
67	171.65	175.61	181.93	186.65	189.33	196.92	203.21	204.22	
69	179.98	185.27	189.93	194.54	196.28	208.53	213.98	218.37	218.83
71	164.03	166.76	172.54	175.09	178.79	188.02	193.47	196.15	197.41
73	165.49	170.34	178.10	181.58	185.73	204.46	208.74	214.31	214.56
75	150.60	155.26	160.24	163.47	166.97	178.89	184.75	190.77	189.85
77	168.94	172.55	177.10	182.26	185.87	198.02	202.82	206.19	207.22
79	165.11	168.20	173.53	176.29	182.37	191.67	196.25	200.74	201.30

Animal	Sex:	Male	Group:	Low		Units:	g		
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
41									
43									
45	208.80	221.40	209.89						
47	206.58	216.11	208.00						
49									
51									
53	200.01	214.14	215.44	208.32					
55	223.49	234.18	237.96	223.88					
57									
59									
61	195.44	207.26	207.31	209.92	207.22				
63	197.78	206.14	208.67	210.82	198.18				
65									
67									
69	221.93	231.69	232.37	236.57	237.85	239.58	247.53	235.00	
71	199.50	209.67	213.28	214.99	216.83	216.61	224.43	213.29	
73									
75									
77	208.95	216.83	218.66	221.79	222.69	227.03	230.36	232.84	229.90
79	203.60	214.02	215.33	216.54	219.20	222.30	231.93	235.11	224.44

Animal	Sex:	Male	Group:	Intermediate		Units: g			
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
81	164.53	166.64	166.95						
83	175.61	180.75	179.53						
85	170.98	176.94	173.32	177.95	180.99	191.49	193.43	197.51	199.08
87	164.25	166.98	170.07	170.45	174.47	184.29	186.36	191.25	194.22
89	164.15	167.64	174.63	168.23					
91	178.90	182.96	187.20	184.93					
93	162.89	165.08	171.61	171.68	174.82	185.69	190.24	193.98	196.12
95	169.28	173.48	180.62	177.70	181.02	192.42	198.22	200.85	204.09
97	167.12	174.22	179.32	186.79	180.58				
99	185.42	189.96	194.98	199.41	192.11				
101	158.45	163.00	169.83	173.86	172.75	187.20	190.74	195.15	200.48
103	184.82	191.23	194.42	198.55	193.94	206.81	208.56	212.85	216.36
105	160.85	165.53	170.03	174.28	178.00	190.89	194.44	190.62	
107	160.22	165.16	169.05	172.04	173.34	184.28	189.96	186.32	
109	163.57	168.93	172.48	177.83	180.67	191.58	197.33	198.10	198.64
111	171.78	177.82	182.85	187.02	190.60	200.29	204.14	204.04	207.54
113	154.94	161.14	165.18	171.20	173.73	184.26	190.30	193.89	190.67
115	156.05	159.96	163.04	165.73	169.64	183.67	189.50	194.72	190.37
117	158.23	165.11	169.50	174.04	178.58	190.89	194.38	200.08	196.56
119	166.44	170.84	175.13	181.21	184.46	199.96	203.93	209.70	207.36

Animal	Sex:	Male	Group:	Intermediate		Units: g			
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
81									
83									
85	203.38	212.70	201.67						
87	196.42	203.74	193.59						
89									
91									
93	201.34	212.50	214.35	201.51					
95	208.35	217.32	221.24	215.07					
97									
99									
101	203.15	216.09	220.70	222.55	212.16				
103	217.91	231.88	231.43	233.94	225.02				
105									
107									
109	202.39	212.63	213.24	217.18	217.95	220.57	227.25	218.09	
111	209.24	219.01	221.95	224.54	226.68	227.60	237.47	224.47	
113									
115									
117	200.73	209.04	211.05	214.77	218.30	222.11	233.59	233.59	228.89
119	212.53	225.27	228.92	233.38	235.83	241.42	251.38	256.55	246.40



Animal	Sex:	Male	Group:	High		Units:	g		
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
121	161.89	166.82	153.35						
123	164.91	168.95	161.33						
125	161.60	167.99	163.17	168.82	169.83	183.68	187.37	190.82	194.02
127	182.64	187.64	184.47	189.99	192.29	204.08	208.33	213.65	217.01
129	147.15	150.93	157.20	139.99					
131	181.32	185.10	188.77	170.72					
133	162.09	168.03	174.74	166.07	170.56	184.51	188.00	191.60	194.28
135	157.81	162.16	169.64	162.59	168.86	182.59	184.75	190.19	193.45
137	175.33	181.70	183.48	188.94	176.24				
139	175.59	182.70	183.47	189.59	179.74				
141	170.83	176.60	179.94	185.16	180.03	191.29	195.17	196.98	199.91
143	158.18	163.08	166.82	170.99	161.57	179.19	183.15	185.61	186.77
145	176.83	182.59	189.58	191.79	193.06	205.25	208.42	191.44	
147	166.94	172.43	177.61	183.38	186.31	197.30	201.17	187.27	
149	169.65	174.63	178.38	181.26	186.23	192.02	197.20	181.06	189.63
151	166.76	171.75	173.96	180.51	184.53	198.77	203.62	192.84	200.40
153	172.86	175.20	179.33	184.38	187.81	199.54	200.04	206.30	186.24
155	176.43	183.68	185.83	190.46	195.32	205.55	209.33	201.08	200.61
157	166.75	171.03	175.76	180.32	184.40	193.75	198.08	202.26	195.46
159	170.25	174.71	179.74	184.85	187.27	197.21	203.28	204.73	191.40

Animal	Sex:	Male	Group:	High		Units:	g		
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
121									
123									
125	198.37	206.36	195.70						
127	221.58	230.16	218.67						
129									
131									
133	199.69	210.34	213.49	203.23					
135	196.87	208.15	211.23	200.81					
137									
139									
141	203.49	212.00	214.97	217.25	211.35				
143	191.00	201.30	202.39	208.22	200.84				
145									
147									
149	194.26	206.65	211.62	213.34	216.46	219.20	228.68	219.10	
151	201.81	215.74	220.76	224.39	223.65	230.01	234.30	227.68	
153									
155									
157	198.83	207.91	209.16	211.06	213.22	216.95	222.68	226.85	222.66
159	201.19	212.73	213.69	216.99	218.10	221.56	235.65	235.45	225.58

## Female Body Weight Measurements for PAO Acute Exposure Study

Animal	Sex:	Female	Group:	Control		Units:	g		
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
2	118.12	118.49	118.69						
4	126.42	128.26	127.40						
6	112.16	114.20	114.47	114.73	117.98	122.21	122.30	123.59	126.59
8	120.14	118.07	119.37	121.33	123.88	128.09	129.87	129.82	131.90
10	126.03	127.11	129.68	126.37					
12	121.30	120.18	123.47	121.59					
14	119.14	118.02	122.67	121.91	122.71	126.23	129.23	128.60	131.64
16	124.39	122.01	123.69	124.85	127.72	133.64	132.02	134.13	137.34
18	121.84	121.86	123.97	125.66	125.11				
20	127.06	128.08	129.32	131.37	133.16				
22	119.67	119.29	122.84	124.78	125.02	131.27	132.24	134.08	135.82
24	127.35	128.27	130.06	132.91	133.79	142.70	144.95	143.82	146.62
26	135.09	132.82	134.66	137.32	139.95	144.74	148.23	146.90	
28	121.04	122.26	121.66	123.58	127.89	128.82	131.86	132.16	
30	122.73	124.41	125.30	128.08	129.52	135.46	136.84	134.11	137.03
32	131.31	128.83	132.31	132.45	136.60	140.40	139.80	138.00	139.12
34	122.76	123.85	127.11	126.51	127.86	135.41	136.86	137.47	138.74
36	126.46	124.94	128.74	130.07	133.56	138.23	140.61	142.80	141.00
38	128.86	128.83	129.97	132.65	135.73	138.74	139.82	143.07	141.48
40	131.57	131.15	132.31	131.85	135.90	140.69	140.02	143.84	143.00

Animal	Sex:	Female	Group:	Control		Units:	g		
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
2									
4									
6	125.84	124.62	120.73						
8	133.36	137.26	128.64						
10									
12									
14	129.69	137.38	138.06	127.46					
16	137.60	141.71	145.35	137.10					
18									
20									
22	136.24	139.53	143.47	143.94	139.38				
24	150.66	155.84	157.46	158.77	149.09				
26									
28									
30	140.09	143.25	144.63	143.31	143.72	145.78	148.98	142.68	
32	141.13	146.42	145.12	145.95	147.79	147.28	152.03	141.23	
34									
36									
38	143.16	148.25	148.74	147.83	150.21	150.09	150.40	154.56	144.33
40	144.58	147.70	147.11	148.10	149.42	148.40	152.61	151.40	146.17

Animal	Sex: Female	Group: Low		Units: g					
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
42	110.32	110.61	112.57						
44	120.07	121.56	122.85						
46	123.23	122.27	124.29	126.69	127.18	130.41	133.92	134.02	138.22
48	121.33	123.03	123.56	124.23	125.23	129.24	130.88	131.86	133.37
50	129.13	130.90	131.15	130.00					
52	120.59	121.94	124.27	126.64					
54	128.58	128.12	128.44	130.19	132.73	138.98	142.48	144.00	145.92
56	139.04	142.09	144.71	146.42	144.74	151.59	154.46	155.70	158.64
58	134.71	137.29	137.30	141.45	141.68				
60	124.80	126.79	128.36	131.87	129.73				
62	122.50	123.58	125.04	128.47	128.20	132.90	134.45	135.98	134.65
64	136.10	136.74	136.24	140.65	140.94	145.42	148.93	150.83	151.29
66	125.83	125.79	127.62	129.75	129.76	117.95	132.94	132.96	
68	130.93	130.78	133.99	137.84	136.63	140.39	141.55	143.07	
70	133.39	136.10	137.93	137.63	140.26	142.89	146.59	149.72	149.38
72	129.46	130.84	131.97	131.66	132.00	138.32	139.60	140.13	139.13
74	125.35	128.57	129.91	130.22	131.98	135.56	138.42	137.42	136.82
76	130.47	133.81	135.23	135.36	134.42	139.87	141.18	141.45	144.49
78	121.23	123.52	126.50	127.28	127.53	134.34	132.80	135.60	135.06
80	123.57	122.28	125.77	125.62	127.21	130.36	134.22	133.06	136.52

Animal	Sex: Female	Group: Low		Units: g					
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
42									
44									
46	135.15	141.78	133.67						
48	133.57	135.60	129.59						
50									
52									
54	145.68	152.82	152.10	147.46					
56	158.03	164.14	165.82	157.08					
58									
60									
62	137.25	140.58	139.09	143.20	135.43				
64	153.53	156.69	159.94	158.42	152.89				
66									
68									
70	150.11	156.69	155.80	156.00	156.28	157.90	163.11	153.90	
72	140.56	148.28	148.22	148.28	149.00	147.20	153.76	146.93	
74									
76									
78	137.00	145.20	142.03	144.76	145.93	144.86	151.57	151.69	147.44
80	135.69	141.15	140.75	139.04	141.43	142.77	144.92	147.32	139.17

Animal	Sex:	Female	Group:	Intermediate		Units: g			
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
82	125.66	126.69	116.20						
84	121.09	121.03	117.08						
86	128.05	129.84	119.97	124.14	126.56	131.85	134.27	136.12	138.51
88	121.91	123.21	122.32	121.96	122.28	127.78	128.62	130.00	131.78
90	122.51	123.59	124.52	120.48					
92	126.04	128.55	130.44	126.88					
94	127.42	132.60	133.11	128.12	130.82	135.69	138.46	141.12	144.36
96	134.66	136.54	136.75	135.73	136.43	142.54	145.94	146.74	149.04
98	120.89	125.32	127.84	130.28	120.96				
100	130.16	132.64	135.00	136.12	124.02				
102	120.14	123.85	127.39	128.45	123.88	130.37	132.94	134.94	134.77
104	110.76	113.01	112.12	113.69	110.33	118.10	119.05	121.53	123.28
106	126.49	128.30	128.53	131.89	132.36	137.48	138.02	132.48	
108	112.72	112.50	110.79	109.47	108.99	127.33	130.01	124.65	
110	122.75	123.59	125.36	126.27	128.49	135.34	133.94	131.57	133.25
112	112.36	115.35	118.09	119.88	120.70	127.07	129.74	122.52	125.26
114	132.31	136.38	137.97	139.66	141.42	148.05	148.79	148.21	146.92
116	123.41	124.36	125.41	127.39	129.41	131.88	133.85	136.27	123.37
118	128.13	130.43	132.65	134.58	134.91	137.92	142.07	143.54	139.88
120	114.97	115.45	117.26	118.25	119.00	122.93	124.59	126.83	121.50

Animal	Sex:	Female	Group:	Intermediate		Units: g			
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
82									
84									
86	137.91	142.99	134.67						
88	131.87	137.67	128.23						
90									
92									
94	142.40	149.07	148.97	143.01					
96	148.55	155.75	157.74	151.10					
98									
100									
102	136.45	142.91	143.33	144.94	140.03				
104	123.30	131.26	133.06	132.96	129.44				
106									
108									
110	132.75	139.87	139.48	143.62	142.98	143.47	149.96	145.43	
112	127.39	134.35	134.27	136.24	138.95	138.27	143.15	132.18	
114									
116									
118	142.23	148.72	150.10	149.28	150.91	149.44	153.93	153.53	147.85
120	125.14	115.91	125.48	126.67	128.47	129.87	136.20	134.50	128.80

Animal	Sex: Female	Group: High		Units: g					
ID	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	27-Jul	28-Jul	29-Jul	30-Jul
122	121.60	123.58	113.73						
124	119.46	121.96	114.76						
126	127.23	127.37	115.77	124.32	123.65	132.96	132.00	133.40	136.49
128	126.47	124.41	116.97	120.20	122.65	128.05	134.01	135.25	137.36
130	117.85	118.61	122.62	-					
132	122.30	125.48	127.28	115.90					
134	131.87	132.46	132.24	123.58	127.23	134.09	134.70	134.35	139.68
136	130.21	130.81	132.28	117.29	121.70	131.55	133.72	136.24	137.59
138	132.72	134.40	136.21	140.78	123.83				
140	117.92	119.86	121.96	125.26	111.40				
142	120.12	122.74	125.55	126.82	112.81	122.86	128.52	131.19	131.86
144	128.86	130.11	132.04	133.07	123.24	132.78	135.09	136.08	137.26
146	128.12	127.62	128.53	130.89	132.35	135.62	137.82	123.74	
148	128.01	131.33	132.36	134.75	136.67	141.78	143.38	127.36	
150	115.97	118.17	119.27	124.02	125.00	127.85	131.59	120.10	126.89
152	120.53	122.18	124.69	124.87	125.68	133.10	132.57	121.06	127.14
154	127.93	127.55	129.60	133.17	130.88	138.06	139.70	140.02	129.13
156	119.20	120.96	122.15	122.37	124.48	131.64	132.30	133.87	120.68
158	124.31	126.12	127.53	130.85	130.80	135.16	136.07	140.22	131.98
160	122.00	124.98	127.23	128.84	128.89	136.06	138.52	138.61	129.51

Animal	Sex: Female	Group: High		Units: g					
ID	31-Jul	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	10-Aug	11-Aug	12-Aug
122									
124									
126	135.63	140.42	133.71						
128	138.19	145.61	137.78						
130									
132									
134	140.58	145.86	146.72	138.66					
136	138.40	145.26	143.56	137.37					
138									
140									
142	133.98	141.70	141.01	142.99	133.11				
144	137.20	138.56	136.80	134.33	136.05				
146									
148									
150	126.60	134.70	137.94	137.70	136.94	140.44	143.46	137.57	
152	129.10	136.56	139.23	141.49	143.01	142.48	148.97	139.33	
154									
156									
158	134.53	141.79	143.74	144.44	144.98	147.56	154.44	154.29	145.28
160	134.26	141.01	141.96	146.59	148.20	148.42	154.70	153.78	146.30

## Male Water Consumption Measurements for PAO Acute Exposure Study

Animal ID	Exposure			Water Consumption Weights (g)						<-- Pre-Exposure Days		Exposure	
	Group	Replicate	Cohort							-2	-1	Day	
1	Control	1	Acute								12.61	14.06	
3	Control	1	Acute								16.68	15.85	
5	Control	1	Recovery								16.69	14.85	
7	Control	1	Recovery								18.81	18.15	
9	Control	2	Acute							18.75	19.39	20.05	
11	Control	2	Acute							21.91	24.89	27.03	
13	Control	2	Recovery							22.29	28.84	25.27	
15	Control	2	Recovery							18.60	22.10	22.50	
17	Control	3	Acute						17.66	21.20	17.67	19.78	
19	Control	3	Acute						17.18	19.44	19.23	19.12	
21	Control	3	Recovery						19.14	21.23	24.14	21.29	
23	Control	3	Recovery						16.64	17.16	17.70	19.75	
25	Control	4	Acute		18.99	22.13	23.11	21.33	21.64		59.25	19.75	18.46
27	Control	4	Acute		18.56	18.93	20.33	19.76	21.50		33.78	11.26	18.97
29	Control	4	Recovery		19.04	22.00	23.23	26.59	23.80		50.70	16.90	22.54
31	Control	4	Recovery		19.41	23.33	22.40	21.81	24.29		17.94	5.98	20.25
33	Control	5	Acute	18.14	17.36	19.79	20.20	20.47		37.51	12.50	21.56	17.22
35	Control	5	Acute	17.23	17.39	18.89	19.51	19.18		55.24	18.41	19.15	17.82
37	Control	5	Recovery	19.08	20.34	20.55	21.36	20.92		29.14	9.71	8.01	7.84
39	Control	5	Recovery	18.80	19.99	20.95	19.80	20.98		29.27	9.76	5.10	6.14
41	Low	1	Acute									19.71	25.77
43	Low	1	Acute									19.84	21.17
45	Low	1	Recovery									18.46	20.29
47	Low	1	Recovery									18.09	20.09
49	Low	2	Acute								14.41	14.44	15.30
51	Low	2	Acute								20.20	22.09	19.27
53	Low	2	Recovery								18.35	19.60	20.96
55	Low	2	Recovery								19.42	27.29	25.16
57	Low	3	Acute							19.31	20.69	20.02	20.23
59	Low	3	Acute							21.22	23.52	25.18	22.60
61	Low	3	Recovery							18.84	20.69	23.12	22.86
63	Low	3	Recovery							15.57	18.48	17.40	15.55
65	Low	4	Acute		22.11	29.91	25.89	25.85	28.50				20.05
67	Low	4	Acute		18.93	20.53	22.06	22.31	23.53		66.55	22.18	20.23
69	Low	4	Recovery		24.62	31.30	33.06	28.85	33.42		70.29	23.43	20.44
71	Low	4	Recovery		17.80	19.47	20.82	18.85	20.64		58.87	19.62	18.91
73	Low	5	Acute	17.53	21.17	19.32	19.85	20.29		62.90	20.97	21.69	20.53
75	Low	5	Acute	17.79	22.87	24.00	19.55	23.76		57.19	19.06	20.48	18.76
77	Low	5	Recovery	15.55	16.41	18.53	16.82	16.71		60.03	20.01	23.61	23.57
79	Low	5	Recovery	24.37	27.79	30.14	28.46	28.91		64.97	21.66	21.64	21.81
				NDR =no data recorded									

Animal	Post-Exposure Days -->													
ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	17.01													
3	22.98													
5	19.15	16.34	17.44		55.48	18.49	17.03	16.84	17.03	18.16		48.27	16.09	13.52
7	23.24	22.58	20.13		57.93	19.31	17.44	19.41	17.70	18.31		64.64	21.55	26.94
9	22.71													
11	41.13													
13	35.25	27.75		65.72	21.91	21.78	22.70	24.21	25.16		69.29	23.10	28.77	26.10
15	27.33	18.50		61.53	20.51	21.47	23.52	20.87	23.06		42.18	14.06	19.95	22.39
17	23.03													
19	20.60													
21	20.44		62.88	20.96	20.58	22.55	21.13	NDR		18.72	6.24	26.21	NDR	23.83
23	18.73		55.71	18.57	17.35	17.63	18.59	17.62		12.83	4.28	18.03	18.42	19.84
25	34.06													
27	20.82													
29	24.38	22.11	24.64		47.58	15.86	7.66	9.74	20.11	20.91		62.60	20.87	17.14
31	22.03	17.48	20.54		18.35	6.12	12.78	10.88	18.66	17.46		53.62	17.87	18.83
33	20.28													
35	20.07													
37	20.14	19.37		57.68	19.23	18.91	21.89	21.92	21.67		58.99	19.66	22.38	20.41
39	18.05	20.21		66.53	22.18	21.63	20.94	21.55	24.10		59.74	19.91	20.63	22.09
41	NDR													
43	38.70													
45	21.14	21.72	18.50				44.50	23.60	22.56	24.33		69.74	23.25	22.69
47	21.57	19.11	20.32		58.87	19.62	21.25	18.27	17.69	21.16		81.27	27.09	19.84
49	15.59													
51	21.89													
53	23.51	20.17		46.76	15.59	23.56	25.33	28.37	25.45		75.07	25.02	25.36	25.81
55	33.86	26.90		68.64	22.88	23.62	21.55	26.94	20.60			NDR	25.34	19.66
57	22.28													
59	20.75													
61	26.17		38.30	12.77	25.11	23.11	20.79	21.80		84.53	28.18	29.33	29.49	48.90
63	21.99		58.47	19.49	22.34	21.51	19.76	18.75		60.98	20.33	21.73	22.17	22.23
65	27.09													
67	NDR													
69	29.46	24.57	23.96		63.20	21.07	23.39	23.74	23.55	19.13		70.92	23.64	33.41
71	24.04	20.57	19.00		61.22	20.41	27.48	31.20	33.38	23.99		23.42	7.81	24.49
73	23.46													
75	20.37													
77	27.61	20.08		48.75	16.25	15.07	15.58	16.80	15.76		12.56	4.19	6.98	20.26
79	24.85	19.80		57.74	19.25	17.88	19.39	20.17	21.63		60.69	20.23	14.49	40.25
	NDR =no data recorded													

Animal	Exposure		Water Consumption Weights (g)							<-- Pre-Exposure Days		Exposure	
ID	Group	Replicate	Cohort							-2	-1	Day	
81	Intermediate	1	Acute								17.23	15.35	
83	Intermediate	1	Acute								17.24	16.16	
85	Intermediate	1	Recovery								19.10	20.09	
87	Intermediate	1	Recovery								NDR	NDR	
89	Intermediate	2	Acute							18.96	19.22	20.50	
91	Intermediate	2	Acute							17.24	19.64	18.77	
93	Intermediate	2	Recovery							16.30	16.60	18.61	
95	Intermediate	2	Recovery							18.54	20.89	22.81	
97	Intermediate	3	Acute						18.60	21.51	21.90	19.14	
99	Intermediate	3	Acute						22.52	25.89	26.76	26.05	
101	Intermediate	3	Recovery						15.45	16.47	18.29	16.69	
103	Intermediate	3	Recovery						18.44	21.60	22.74	24.35	
105	Intermediate	4	Acute		16.82	19.52	18.35	19.74	19.69		59.71	19.90	18.92
107	Intermediate	4	Acute		17.77	18.59	20.87	21.16	19.19		60.80	20.27	23.32
109	Intermediate	4	Recovery		18.68	19.49	21.11	21.65	21.28		62.62	20.87	20.60
111	Intermediate	4	Recovery		19.82	21.78	21.46	24.20	21.48				19.29
113	Intermediate	5	Acute	15.83	18.17	17.96	20.64	18.32		54.18	18.06	20.01	17.93
115	Intermediate	5	Acute	17.60	18.72	17.79	19.36	17.57				21.03	19.16
117	Intermediate	5	Recovery	29.47	22.46	20.18	23.85	20.89		65.23	21.74	20.38	22.02
119	Intermediate	5	Recovery	17.80	21.04	21.12	22.70	21.21				26.15	26.31
121	High	1	Acute									14.46	15.12
123	High	1	Acute									17.75	16.76
125	High	1	Recovery									16.94	19.62
127	High	1	Recovery									15.83	18.24
129	High	2	Acute							15.15	16.90	15.63	
131	High	2	Acute							17.83	22.31	21.32	
133	High	2	Recovery							17.41	22.03	18.69	
135	High	2	Recovery							16.16	17.84	19.83	
137	High	3	Acute						18.29	21.40	21.51	19.46	
139	High	3	Acute						19.18	21.16	21.79	21.38	
141	High	3	Recovery						17.96	21.07	19.80	21.46	
143	High	3	Recovery						16.25	17.62	18.00	21.87	
145	High	4	Acute		18.41	20.96	21.17	20.88	19.15		55.44	18.48	19.48
147	High	4	Acute		17.05	18.45	19.73	19.94	19.92		60.38	20.13	19.06
149	High	4	Recovery		15.94	20.66	18.25	17.74	19.87		44.62	14.87	25.06
151	High	4	Recovery		17.96	22.51	19.24	22.14	22.03		67.51	22.50	26.05
153	High	5	Acute	17.67	15.08	19.11	20.44	21.66		61.41	20.47	23.31	18.75
155	High	5	Acute	20.45	25.79	25.32	27.44	32.82		58.15	19.38	21.44	NDR
157	High	5	Recovery	21.22	24.36	24.22	27.29	26.71		56.26	18.75	23.02	21.24
159	High	5	Recovery	20.23	23.11	22.93	22.61	22.30		61.04	20.35	23.57	20.08
				NDR =no data recorded									



Animal ID	Post-Exposure Days -->													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
81	22.96													
83	22.71													
85	16.99	23.36	20.23		55.91	18.64	18.37	17.40	15.56	16.59		33.88	11.29	13.82
87	19.67	21.11	18.63				23.63	20.04	18.88	18.41		56.38	18.79	17.87
89	16.16													
91	18.30													
93	20.94	18.05		65.13	21.71	18.79	28.58	NDR	17.22		52.06	17.35	20.99	11.87
95	19.91	19.75		65.32	21.77	26.21	24.74	24.65	23.84		61.49	20.50	19.59	16.37
97	16.86													
99	28.04													
101	15.74		46.75	15.58	18.11	19.63	20.46	18.47		59.32	19.77	21.62	20.45	24.71
103	20.55				16.96	18.57	17.06	18.08		62.93	20.98	22.63	27.49	45.53
105	18.72													
107	27.17													
109	24.27	19.59	21.52		60.00	20.00	18.98	19.63	19.78	18.75		57.25	19.08	19.94
111	20.98	22.83	20.86		63.09	21.03	19.90	20.56	26.49	19.93		67.94	22.65	25.29
113	20.15													
115	18.96													
117	19.62	19.96		57.20	19.07	17.95	18.64	23.03	21.26		56.98	18.99	17.30	21.71
119	22.74	23.16		65.39	21.80	22.40	23.78	26.42	25.55		62.38	20.79	25.68	19.76
121	4.17													
123	NDR													
125	15.75	23.79	16.65		96.43	32.14	22.04	19.63	18.78	19.85		50.69	16.90	13.92
127	15.68	22.44	19.01		54.70	18.23	19.61	21.13	18.84	19.69		58.51	19.50	14.93
129	8.77													
131	6.69													
133	14.76	18.71				20.28	18.82	19.73	19.80		65.27	21.76	22.95	17.33
135	12.91	20.06		61.21	20.40	23.68	22.68	24.87	20.98		54.67	18.22	17.89	10.32
137	12.71													
139	12.35													
141	18.61		67.96	22.65	24.14	22.62	26.96	23.67		59.74	19.91	20.65	21.81	22.93
143	9.69		60.58	20.19	21.28	19.49	18.28	20.05		54.14	18.05	18.02	18.65	21.82
145	5.69													
147	6.41													
149	15.07	24.42	20.85		60.54	20.18	21.46	19.15	21.02	19.25		167.25	55.75	15.49
151	17.81	25.78	20.88		68.55	22.85	23.30	23.61	24.77	25.83		59.87	19.96	19.33
153	5.19													
155	18.06													
157	15.73	22.18		26.96	8.99	4.86	3.21	22.76	20.78		55.92	18.64	17.73	22.71
159	8.15	23.32		35.17	11.72	6.07	6.47	21.05	19.72		61.28	20.43	20.57	21.97
	NDR =no data recorded													

## Female Water Consumption Measurements for PAO Acute Exposure Study

Animal	Exposure	Water Consumption Weights (g)								<-- Pre-Exposure Days		Exposure	
ID	Group	Replicate	Cohort							-2	-1	Day	
2	Control	1	Acute								16.84	16.69	
4	Control	1	Acute								17.98	18.21	
6	Control	1	Recovery								NDR	13.35	
8	Control	1	Recovery								12.58	11.61	
10	Control	2	Acute							14.65	17.86	15.81	
12	Control	2	Acute							12.70	12.22	12.83	
14	Control	2	Recovery							11.24	12.59	13.98	
16	Control	2	Recovery							13.57	13.22	14.41	
18	Control	3	Acute						16.35	17.42	21.15	18.68	
20	Control	3	Acute						12.80	15.36	15.82	14.23	
22	Control	3	Recovery						14.00	14.25	15.42	16.63	
24	Control	3	Recovery						15.84	17.81	17.31	16.68	
26	Control	4	Acute		13.92	13.97	15.41	17.32	15.24		29.93	9.98	14.09
28	Control	4	Acute		15.69	15.19	14.52	16.97	17.73		28.28	9.43	14.90
30	Control	4	Recovery		13.39	17.86	16.71	17.88	16.05		44.45	14.82	17.21
32	Control	4	Recovery		16.98	18.12	20.82	21.28	17.39		14.20	4.73	17.30
34	Control	5	Acute	16.99	18.43	19.86	17.10	20.04		28.43	9.48	15.36	17.01
36	Control	5	Acute	12.99	13.31	15.64	14.07	14.97		10.67	3.56	12.03	3.85
38	Control	5	Recovery	16.25	17.36	21.30	19.72	20.20		51.32	17.11	5.14	6.42
40	Control	5	Recovery	16.81	17.35	17.96	17.97	22.39		20.62	6.87	1.84	2.87
42	Low	1	Acute								10.75	13.57	
44	Low	1	Acute								14.21	21.19	
46	Low	1	Recovery								13.72	13.40	
48	Low	1	Recovery								14.48	18.85	
50	Low	2	Acute							13.69	16.45	15.28	
52	Low	2	Acute							14.14	20.20	17.74	
54	Low	2	Recovery							14.63	14.36	13.76	
56	Low	2	Recovery							14.72	18.84	16.56	
58	Low	3	Acute						13.42	17.15	15.35	15.90	
60	Low	3	Acute						17.29	22.85	22.88	24.36	
62	Low	3	Recovery						15.17	18.82	18.43	17.76	
64	Low	3	Recovery						16.11	17.00	16.60	16.80	
66	Low	4	Acute		17.27	21.76	24.34	26.09	22.82				35.03
68	Low	4	Acute		16.29	16.70	19.98	20.71	19.50		57.71	19.24	18.85
70	Low	4	Recovery		16.43	22.10	19.24	20.73	18.94		66.19	22.06	38.21
72	Low	4	Recovery		13.65	13.86	15.31	15.45	15.13		60.59	20.20	20.98
74	Low	5	Acute	13.59	16.07	15.98	16.16	17.56		52.27	17.42	25.18	16.09
76	Low	5	Acute	14.06	20.69	17.95	17.59	16.13		49.57	16.52	13.34	NDR
78	Low	5	Recovery	14.44	18.43	17.18	17.19	15.81		63.33	21.11	18.04	21.15
80	Low	5	Recovery	17.27	21.18	22.88	20.52	20.03		61.17	20.39	NDR	19.19
							NDR =no data recorded						

Animal ID	Post-Exposure Days -->													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	48.21													
4	34.55													
6	14.27	15.94	12.40		38.06	12.69	13.33	13.47	13.91	12.84			NDR	18.92
8	14.00	15.94	12.48		43.20	14.40	14.33	12.98	11.72	13.98		37.94	12.65	NDR
10	21.96													
12	15.62													
14	14.87	11.83		41.17	13.72	14.62	13.65	12.64	12.11		33.90	11.30	17.64	12.75
16	19.43	14.60		41.77	13.92	17.19	15.53	16.20	14.77		25.24	8.41	16.31	15.01
18	20.10													
20	19.72													
22	14.00		47.84	15.95	14.09	17.18	15.65	15.32		8.34	2.78	15.09	16.44	12.83
24	17.17		55.05	18.35	18.18	18.72	17.72	18.47		8.99	3.00	19.20	17.62	12.13
26	27.14													
28	17.06													
30	21.39	18.78	19.56		40.87	13.62	3.08	3.49	15.55	20.07		54.07	18.02	13.41
32	19.12	16.24	18.63			NDR	NDR	8.20	19.09	20.10		53.69	17.90	16.15
34	21.36													
36	18.38													
38	14.96	16.95		60.74	20.25	17.51	21.90	19.64	20.68		49.49	16.50	17.88	NDR
40	17.78	15.35		53.16	17.72	19.05	18.81	16.66	19.34		53.39	17.80	17.68	22.86
42	NDR													
44	37.56													
46	17.65	19.19	16.71		80.84	26.95	19.46	14.91	16.99	16.52		43.47	14.49	11.29
48	17.00	17.97	15.87		57.27	19.09	19.39	15.67	17.42	17.18		47.86	15.95	22.29
50	19.36													
52	20.05													
54	23.77	15.88		52.68	17.56	18.45	18.23	15.21	17.13		55.82	18.61	22.90	34.41
56	23.51	19.33		58.64	19.55	18.96	19.14	18.44	16.49		52.36	17.45	18.08	9.73
58	19.86													
60	33.79													
62	17.96		63.15	21.05	20.25	19.52	36.81	NDR		53.37	17.79	16.12	16.53	16.24
64	23.87		50.84	16.95	19.24	19.94	16.56	16.33		54.15	18.05	24.77	21.95	34.99
66	18.73													
68	26.87													
70	NDR	17.31	15.86		51.04	17.01	24.00	22.83	21.71	20.66		23.19	7.73	16.02
72	31.90	26.28	25.48		100.28	33.43	16.96	16.22	17.31	15.10		11.92	3.97	14.52
74	20.56													
76	23.44													
78	21.43	19.95		73.47	24.49	18.44	20.96	21.14	21.38		19.71	6.57	6.43	16.35
80	19.63	17.84		53.27	17.76	16.04	19.75	19.72	18.24		47.24	15.75	16.65	13.79
	NDR =no data recorded													

Animal ID	Exposure Group	Replicate	Cohort	Water Consumption Weights (g)						<-- Pre-Exposure Days		Exposure Day	
										-2	-1		
82	Intermediate	1	Acute								13.43	11.92	
84	Intermediate	1	Acute								10.89	11.82	
86	Intermediate	1	Recovery								12.76	14.97	
88	Intermediate	1	Recovery								10.82	13.51	
90	Intermediate	2	Acute							15.26	16.09	15.98	
92	Intermediate	2	Acute							12.47	18.23	16.73	
94	Intermediate	2	Recovery							17.09	19.25	17.00	
96	Intermediate	2	Recovery							14.56	15.09	14.96	
98	Intermediate	3	Acute						17.75	22.30	25.77	24.16	
100	Intermediate	3	Acute						12.20	14.27	13.61	14.12	
102	Intermediate	3	Recovery						13.00	16.60	18.43	15.76	
104	Intermediate	3	Recovery						17.16	18.36	19.42	19.33	
106	Intermediate	4	Acute		13.72	17.61	17.60	19.56	16.33		53.12	17.71	16.19
108	Intermediate	4	Acute		14.08	11.25	8.55	8.98	8.19		63.11	21.04	18.28
110	Intermediate	4	Recovery		13.82	13.02	13.20	14.24	13.10		49.85	16.62	13.34
112	Intermediate	4	Recovery		12.66	15.90	13.75	16.59	18.29		52.88	17.63	19.10
114	Intermediate	5	Acute	11.95	18.99	17.77	15.46	17.33		54.86	18.29	16.29	16.29
116	Intermediate	5	Acute	17.02	20.46	19.11	20.24	20.34		47.60	15.87	16.43	16.33
118	Intermediate	5	Recovery	14.77	17.35	19.77	19.53	16.57		49.99	16.66	20.71	16.34
120	Intermediate	5	Recovery	14.36	13.94	16.90	17.31	14.48		46.14	15.38	14.63	14.52
122	High	1	Acute									14.02	14.13
124	High	1	Acute									13.39	15.57
126	High	1	Recovery									15.85	15.03
128	High	1	Recovery									15.27	13.61
130	High	2	Acute								15.27	17.27	17.88
132	High	2	Acute								12.54	15.95	13.04
134	High	2	Recovery								14.19	15.12	11.55
136	High	2	Recovery								16.37	17.00	15.39
138	High	3	Acute							14.74	18.50	16.28	20.00
140	High	3	Acute							6.38	14.87	13.95	12.37
142	High	3	Recovery							14.77	17.91	15.97	19.34
144	High	3	Recovery							12.95	18.26	17.26	18.00
146	High	4	Acute		17.84	23.98	21.28	20.14	17.96		71.05	23.68	22.48
148	High	4	Acute		15.05	18.44	18.14	15.94	15.77		54.88	18.29	16.47
150	High	4	Recovery		15.52	17.32	16.39	16.85	17.48		44.66	14.89	17.77
152	High	4	Recovery		14.63	18.15	16.36	16.58	18.25		58.15	19.38	18.90
154	High	5	Acute	15.66	16.55	17.23	17.70	15.53		57.02	19.01	22.57	18.37
156	High	5	Acute	16.94	20.10	18.86	19.88	20.98		58.38	19.46	19.67	19.38
158	High	5	Recovery	17.26	20.75	20.78	19.67	22.35		54.31	18.10	17.77	20.62
160	High	5	Recovery	16.71	20.23	17.05	19.15	18.26		59.91	19.97	19.24	18.94
							NDR =no data recorded						

Animal ID	Post-Exposure Days -->													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
82	6.91													
84	10.34													
86	1.61	16.16	13.97		51.07	17.02	17.39	16.66	15.61	15.54		44.15	14.72	12.01
88	11.83	18.49	15.18		51.15	17.05	14.85	14.29	13.48	13.58		41.86	13.95	12.28
90	14.03													
92	17.12													
94	14.95	19.39		57.91	19.30	34.51	23.53	20.38	18.41		60.23	20.08	21.21	12.25
96	15.00	15.24		98.30	32.77	19.24	17.70	20.34	19.14		51.22	17.07	16.30	14.59
98	26.84													
100	2.02													
102	13.72		51.91	17.30	NDR	19.04	18.41	14.44		50.32	16.77	18.49	18.21	24.68
104	21.59		47.39	15.80	16.75	16.83	14.23	13.50		45.48	15.16	18.44	19.99	34.11
106	15.13													
108	13.52													
110	13.49	14.97	13.15		39.41	13.14	12.56	14.16	14.68	11.60		40.87	13.62	14.91
112	12.21	14.63	18.03		50.42	16.81	16.64	15.82	17.93	14.39		43.76	14.59	15.21
114	17.24													
116	4.19													
118	16.73	20.59		62.10	20.70	19.24	18.86	22.44	19.63		49.69	16.56	16.44	13.65
120	8.98	14.72				23.00	15.71	17.65	18.55		50.82	16.94	15.65	13.79
122	11.53													
124	14.54													
126	3.75	21.99	17.75		49.07	16.36	18.91	20.04	18.48	16.89		49.52	16.51	15.34
128	1.62	19.19	17.53		60.32	20.11	24.54	21.85	20.84	23.02		54.41	18.14	17.43
130	10.83													
132	3.14													
134	5.74	16.44		46.01	15.34	20.27	15.94	19.28	14.92		46.59	15.53	16.24	9.87
136	4.06	20.06		51.95	17.32	15.22	16.68	17.76	15.33		47.54	15.85	16.72	13.12
138	11.11													
140	2.50													
142	2.33		62.87	20.96	19.79	16.98	20.34	17.79		54.70	18.23	18.60	21.34	18.66
144	6.41		54.32	18.11	19.74	16.81	17.53	16.81		49.52	16.51	10.49	7.61	12.19
146	5.74													
148	6.43													
150	6.05	17.81	14.74		47.99	16.00	17.31	16.90	17.06	16.08		48.80	16.27	19.00
152	6.75	23.24	17.07		85.44	28.48	24.07	22.50	23.27	16.40		61.49	20.50	20.62
154	8.06													
156	7.51													
158	11.76	17.68		19.84	6.61	4.32	8.13	19.24	21.76		61.97	20.66	19.70	NDR
160	6.44	20.64		37.89	12.63	10.97	10.42	24.63	22.28		53.73	17.91	19.77	16.60
	NDR =no data recorded													

## Male Food Consumption Measurements for PAO Acute Exposure Study

Animal	Exposure	Food Consumption Weights (g)								<-- Pre-Exposure Days		Exposure	
ID	Group	Replicate	Cohort								-2	-1	Day
1	Control	1	Acute									9.82	10.65
3	Control	1	Acute									11.36	14.42
5	Control	1	Recovery									9.31	11.44
7	Control	1	Recovery									10.95	11.74
9	Control	2	Acute								9.48	13.43	17.75
11	Control	2	Acute								11.63	13.77	17.98
13	Control	2	Recovery								13.19	15.62	20.58
15	Control	2	Recovery								10.58	14.21	18.19
17	Control	3	Acute							11.93	14.95	17.21	19.11
19	Control	3	Acute							11.41	13.61	19.91	18.54
21	Control	3	Recovery							11.08	12.86	15.47	18.00
23	Control	3	Recovery							9.89	12.29	15.09	16.24
25	Control	4	Acute		11.22	14.81	17.55	15.70	15.89		44.55	14.85	16.45
27	Control	4	Acute		12.79	14.26	19.69	17.74	17.66		49.18	16.39	17.34
29	Control	4	Recovery		10.77	13.43	16.25	16.98	15.39		48.68	16.23	17.42
31	Control	4	Recovery		11.11	13.53	16.36	18.06	13.89		47.57	15.86	16.78
33	Control	5	Acute	9.21	10.75	18.91	16.96	15.15		45.62	15.21	17.36	15.77
35	Control	5	Acute	10.67	13.44	17.50	17.24	16.69		47.28	15.76	13.44	16.90
37	Control	5	Recovery	10.57	17.88	17.39	18.11	15.94		47.67	15.89	16.61	16.02
39	Control	5	Recovery	11.59	14.13	19.74	17.35	18.44		52.35	17.45	20.49	17.22
41	Low	1	Acute									10.29	11.60
43	Low	1	Acute									11.94	14.59
45	Low	1	Recovery									19.36	15.10
47	Low	1	Recovery									11.91	12.79
49	Low	2	Acute								10.58	11.46	15.96
51	Low	2	Acute								11.20	15.84	17.32
53	Low	2	Recovery								9.48	11.64	15.33
55	Low	2	Recovery								8.68	14.48	17.87
57	Low	3	Acute							12.56	16.04	20.74	19.73
59	Low	3	Acute							12.12	15.74	18.72	18.57
61	Low	3	Recovery							8.25	15.00	17.31	16.98
63	Low	3	Recovery							5.10	13.23	15.73	14.63
65	Low	4	Acute		10.74	14.72	17.24	18.16	15.92		46.21	15.40	15.04
67	Low	4	Acute		11.75	14.15	19.29	16.77	14.27		41.54	13.85	15.94
69	Low	4	Recovery		12.15	16.52	18.26	18.67	15.46		49.62	16.54	16.28
71	Low	4	Recovery		10.76	13.87	17.77	16.35	16.46		44.87	14.96	13.95
73	Low	5	Acute	11.04	14.32	20.15	17.26	16.28		53.42	17.81	16.42	17.87
75	Low	5	Acute	5.33	12.87	16.45	13.96	12.45		40.94	13.65	15.73	14.71
77	Low	5	Recovery	10.04	12.53	16.10	16.81	14.64		46.62	15.54	14.14	15.90
79	Low	5	Recovery	11.27	14.86	19.17	17.15	16.88		47.96	15.99	15.93	15.60

Animal Post-Exposure Days -->														
ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	14.56													
3	17.45													
5	17.29	14.62	12.63		46.62	15.54	15.62	14.04	15.09	14.83		52.07	17.36	4.61
7	16.81	15.82	15.49		42.90	14.30	14.68	16.33	14.12	16.31		47.73	15.91	6.96
9	19.45													
11	17.26													
13	19.81	18.03		51.38	17.13	18.34	17.12	17.31	20.79		57.30	19.10	19.92	
15	19.03	14.83		48.58	16.19	14.86	16.71	17.26	18.04		55.30	18.43	15.30	
17	14.08													
19	16.54													
21	15.20		48.28	16.09	14.84	18.12	15.56	14.20		56.78	18.93	16.36	2.67	
23	14.60		44.93	14.98	15.77	15.14	16.74	14.86		50.39	16.80	14.83	16.13	
25	14.96													
27	14.76													
29	16.09	16.55	15.95		53.94	17.98	18.62	18.52	18.34	19.20		50.18	16.73	
31	16.94	16.05	18.19		53.39	17.80	17.09	17.60	15.70	19.51		51.85	17.28	
33	15.69													
35	15.25													
37	15.89	17.95		47.19	15.73	16.26	17.33	18.67	13.20		47.51	15.84	16.11	
39	17.70	19.71		52.26	17.42	15.83	19.18	15.45	19.33		52.30	17.43	15.18	
41	15.74													
43	19.68													
45	17.11	17.09	13.45		32.38	10.79	15.57	16.58	17.12	17.18		51.91	17.30	5.68
47	16.15	16.68	13.57		41.48	13.83	15.57	14.00	13.48	15.44		49.85	16.62	4.71
49	12.74													
51	16.08													
53	15.18	14.29		35.18	11.73	13.61	15.88	13.87	15.43		48.69	16.23	15.29	
55	17.33	15.00		49.86	16.62	17.45	14.78	18.17	15.87		54.53	18.18	16.68	
57	16.39													
59	13.85													
61	14.45		35.66	11.89	15.36	15.21	16.57	16.94		50.96	16.99	14.68	16.32	
63	13.44		42.61	14.20	15.36	14.17	16.88	14.10		46.25	15.42	15.22	17.65	
65	16.84													
67														
69	17.21	15.72	18.54		52.86	17.62	16.71	18.79	17.52	16.68		51.37	17.12	
71	15.25	14.63	15.99		50.51	16.84	16.59	16.50	14.68	15.18		47.53	15.84	
73	16.96													
75	14.80													
77	16.10	16.85		48.27	16.09	13.80	15.89	15.85	16.57		44.88	14.96	14.01	
79	16.35	19.69		51.13	17.04	14.68	17.29	17.17	16.04		51.80	17.27	16.77	

Animal ID	Exposure Group	Replicate	Cohort	Food Consumption Weights (g)							<-- Pre-Exposure Days		Exposure Day
											-2	-1	
81	Intermediate	1	Acute									11.35	11.91
83	Intermediate	1	Acute									15.02	14.01
85	Intermediate	1	Recovery									13.31	14.65
87	Intermediate	1	Recovery									12.98	14.33
89	Intermediate	2	Acute								11.34	12.72	17.46
91	Intermediate	2	Acute								13.08	15.02	17.60
93	Intermediate	2	Recovery								12.36	12.50	17.82
95	Intermediate	2	Recovery								0.00	13.59	19.07
97	Intermediate	3	Acute							11.93	15.31	19.16	19.13
99	Intermediate	3	Acute							15.63	16.61	19.03	19.61
101	Intermediate	3	Recovery							12.64	12.54	17.85	15.75
103	Intermediate	3	Recovery							12.29	14.82	17.36	16.95
105	Intermediate	4	Acute		12.66	14.77	16.81	17.63	12.74		46.97	15.66	14.88
107	Intermediate	4	Acute		11.68	12.89	16.42	17.91	13.67		45.89	15.30	16.23
109	Intermediate	4	Recovery		3.15	13.90	16.59	16.84	16.05		43.07	14.36	16.10
111	Intermediate	4	Recovery		11.58	16.37	19.77	18.16	15.32		47.99	16.00	15.91
113	Intermediate	5	Acute	11.15	13.91	16.62	17.88	14.39		45.93	15.31	14.22	14.37
115	Intermediate	5	Acute	10.35	11.18	15.23	15.03	11.43		44.89	14.96	15.17	16.06
117	Intermediate	5	Recovery	12.66	16.12	19.50	17.91	14.50		47.93	15.98	16.79	16.14
119	Intermediate	5	Recovery	12.11	14.63	18.61	18.38	17.35		40.13	13.38	18.84	19.80
121	High	1	Acute									11.34	12.82
123	High	1	Acute									12.04	13.56
125	High	1	Recovery									12.63	13.47
127	High	1	Recovery									11.51	15.40
129	High	2	Acute								10.99	11.05	14.23
131	High	2	Acute								11.93	13.81	17.71
133	High	2	Recovery								10.52	10.32	19.09
135	High	2	Recovery								10.56	13.03	17.52
137	High	3	Acute							12.68	16.00	16.43	17.11
139	High	3	Acute							14.20	15.13	10.61	17.25
141	High	3	Recovery							11.75	14.32	18.07	18.13
143	High	3	Recovery							11.65	14.33	16.01	15.88
145	High	4	Acute		13.15	15.13	20.57	17.31	15.59		46.05	15.35	17.26
147	High	4	Acute		12.52	14.60	17.24	15.07	17.03		45.83	15.28	15.92
149	High	4	Recovery		10.56	13.76	15.54	15.73	16.63		36.10	12.03	16.31
151	High	4	Recovery		10.31	14.89	18.21	17.60	17.78		47.88	15.96	16.61
153	High	5	Acute	10.94	14.61	14.73	17.66	17.05		48.87	16.29	16.20	15.81
155	High	5	Acute	12.41	13.44	15.77	19.32	15.84		45.14	15.05	14.78	11.71
157	High	5	Recovery	10.94	15.14	19.97	19.26	15.32		48.94	16.31	16.49	17.69
159	High	5	Recovery	12.37	13.51	18.35	17.44	14.02		46.50	15.50	15.66	15.38



Animal Post-Exposure Days -->														
ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
81	12.83													
83	16.31													
85	13.40	17.48	14.15		44.40	14.80	15.26	14.67	13.81	15.41		48.53	16.18	4.15
87	13.87	16.90	14.49		41.25	13.75	12.59	15.72	15.79	15.50		46.13	15.38	4.42
89	10.30													
91	14.42													
93	14.86	13.85		44.53	14.84	15.13	15.48	NDR	28.61*		53.98	17.99	17.17	
95	12.23	14.30		44.15	14.72	15.43	13.73	14.69	16.74		52.19	17.40	16.38	
97	10.21													
99	11.40													
101	12.27		44.41	14.80	14.40	15.87	17.28	16.64		51.62	17.21	17.84	15.07	
103	11.88		49.04	16.35	14.15	14.68	17.62	15.93		54.56	18.19	13.74	17.84	
105	10.76													
107	11.70													
109	13.57	15.68	16.16		50.76	16.92	14.83	17.55	15.84	15.69		48.67	16.22	
111	14.87	16.75	18.09		50.66	16.89	16.41	17.85	16.39	16.10		50.19	16.73	
113	11.65													
115	10.51													
117	12.70	16.44		51.11	17.04	15.77	17.73	18.26	17.18		52.73	17.58	16.55	
119	14.48	19.64		55.42	18.47	16.83	18.08	18.77	18.64		57.38	19.13	20.92	
121														
123	9.80													
125	11.36	17.81	14.36		44.92	14.97	14.70	15.58	14.86	15.48		48.63	16.21	4.78
127	12.17	19.12	15.26		47.76	15.92	13.87	17.90	16.45	17.04		51.04	17.01	3.88
129	3.72													
131	3.12													
133	9.91	13.23		44.51	14.84	13.18	13.60	15.09	15.87		47.13	15.71	16.53	
135	9.45	14.24		45.09	15.03	12.96	14.71	14.70	15.64		51.03	17.01	15.20	
137	7.02													
139														
141	11.80		45.65	15.22	15.70	15.05	15.68	15.91		48.29	16.10	16.29	14.84	
143	8.33		45.54	15.18	14.49	14.19	15.67	13.75		48.89	16.30	14.79	17.29	
145	5.72													
147	4.22													
149	4.68	11.68	16.68		47.98	15.99	16.82	15.86	17.48	16.45		48.17	16.06	
151	7.58	16.34	15.44		53.14	17.71	18.31	16.90	16.94	20.41		51.48	17.16	
153	3.54													
155	10.57													
157	11.10	17.01		50.57	16.86	15.72	17.33	18.10	17.87				18.20	
159	6.63	16.82		50.49	16.83	14.24	16.70	16.42	17.28		52.60	17.53	15.14	
	NDR =no data recorded			*Unusually high value; May account for 2 days of feed use										

## Female Food Consumption Measurements for PAO Acute Exposure Study

Animal ID	Exposure Group	Replicate	Cohort	Food Consumption Weights (g)						<-- Pre-Exposure Days		Exposure Day
										-2	-1	
2	Control	1	Acute								8.51	8.98
4	Control	1	Acute								8.87	10.81
6	Control	1	Recovery								7.67	10.83
8	Control	1	Recovery								8.45	8.01
10	Control	2	Acute							7.07	12.22	11.86
12	Control	2	Acute							8.94	11.39	11.65
14	Control	2	Recovery							9.07	11.27	13.50
16	Control	2	Recovery							8.11	10.19	11.48
18	Control	3	Acute							7.96	11.41	14.72
20	Control	3	Acute							6.33	10.42	14.77
22	Control	3	Recovery							8.48	9.39	12.70
24	Control	3	Recovery							9.41	10.53	13.50
26	Control	4	Acute		9.93	9.61	12.17	13.72	11.70		37.18	12.39
28	Control	4	Acute		8.63	11.26	11.43	12.06	11.68		30.32	10.11
30	Control	4	Recovery		9.03	8.93	12.75	13.68	11.69		34.12	11.37
32	Control	4	Recovery		8.66	9.04	13.56	12.37	10.91		30.53	10.18
34	Control	5	Acute	7.77	9.38	13.25	11.47	10.87		32.08	10.69	11.71
36	Control	5	Acute	8.83	11.14	12.60	13.58	11.73		29.76	9.92	12.41
38	Control	5	Recovery	8.70	10.44	10.91	12.81	10.72		31.05	10.35	11.76
40	Control	5	Recovery	8.74	9.91	14.61	12.81	11.82		37.41	12.47	12.19
42	Low	1	Acute								6.63	7.35
44	Low	1	Acute								7.51	9.26
46	Low	1	Recovery								7.58	8.66
48	Low	1	Recovery								6.50	9.37
50	Low	2	Acute							8.08	11.41	13.21
52	Low	2	Acute							9.23	9.32	14.46
54	Low	2	Recovery							8.65	10.65	12.88
56	Low	2	Recovery							8.39	12.33	13.35
58	Low	3	Acute							8.71	10.03	13.87
60	Low	3	Acute							7.73	10.02	13.04
62	Low	3	Recovery							8.63	10.96	13.80
64	Low	3	Recovery							9.64	10.70	14.07
66	Low	4	Acute		8.55	9.33	14.01	11.73	10.26		4.09	1.36
68	Low	4	Acute		10.16	10.42	17.07	15.31	12.49		35.23	11.74
70	Low	4	Recovery		8.62	11.38	14.31	13.21	10.73		31.44	10.48
72	Low	4	Recovery		8.03	9.75	15.32	13.06	11.33		34.43	11.48
74	Low	5	Acute	8.48	11.39	15.28	13.12	11.66		32.90	10.97	11.47
76	Low	5	Acute	8.17	12.01	12.17	11.51	11.19		34.96	11.65	8.28
78	Low	5	Recovery	8.78	9.23	15.89	12.71	11.01		35.77	11.92	9.25
80	Low	5	Recovery	8.24	10.34	14.80	12.51	10.11		34.38	11.46	8.62

Animal	Post-Exposure Days -->													
ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	13.34													
4	13.83													
6	11.43	12.15	10.00		30.49	10.16	10.59	10.18	11.84	10.84		*59.97	19.99	
8	13.92	13.11	9.45		31.87	10.62	11.69	10.35	10.56	12.64		34.47	11.49	
10	11.50													
12	11.58													
14	11.21	9.38		30.60	10.20	10.32	9.31	10.64	9.42		35.60	11.87	10.09	NDR
16	12.73	9.45		30.41	10.14	9.70	10.05	11.16	13.14		36.19	12.06	10.41	NDR
18	11.34													
20	11.29													
22	9.77		30.79	10.26	10.95	12.39	9.80	12.19		37.39	12.46	11.19	10.96	NDR
24	10.26		33.68	11.23	14.28	12.34	10.70	15.10		43.44	14.48	11.01	12.24	NDR
26	11.11													
28	13.53													
30	10.71	11.60	13.39		38.25	12.75	11.49	12.55	11.26	14.01		41.41	13.80	NDR
32	10.61	11.52	12.66		33.15	11.05	7.32	11.07	15.31	8.73		36.85	12.28	NDR
34	10.20													
36	11.05													
38	10.67	13.11		37.14	12.38	9.44	12.24	11.93	9.78		34.25	11.42	10.81	NDR
40	11.77	12.86		36.58	12.19	10.17	12.09	10.36	12.37		33.74	11.25	10.30	NDR
42	7.76													
44	12.72													
46	11.61	11.59	10.52		31.66	10.55	9.88	11.00	12.19	11.24		32.91	10.97	4.53
48	13.08	12.22	10.28		28.10	9.37	9.33	11.02	10.98	10.71		33.43	11.14	3.75
50	11.87													
52	13.73													
54	12.58	11.03		35.19	11.73	12.55	11.23	11.54	11.43		37.25	12.42	11.71	NDR
56	13.94	11.73		35.78	11.93	12.88	11.50	12.05	11.41		36.69	12.23	11.08	NDR
58	11.39													
60	12.21													
62	10.82		31.93	10.64	11.54	11.38	10.78	12.25		39.38	13.13	9.09	12.03	NDR
64	13.90		34.35	11.45	10.86	12.28	12.06	13.45		38.82	12.94	12.71	12.73	NDR
66	11.83													
68	11.49													
70	11.31	11.25	12.37		37.22	12.41	10.46	10.83	11.08	10.65		33.98	11.33	NDR
72	10.73	9.55	12.90		39.37	13.12	11.01	12.26	11.13	11.13		37.10	12.37	NDR
74	9.98													
76	13.34													
78	11.27	11.24		39.26	13.09	11.55	11.31	11.05	11.80		37.21	12.40	10.96	NDR
80	13.31	12.04		36.64	12.21	10.01	11.41	10.65	10.89		34.99	11.66	10.67	NDR
	NDR =no data recorded				*Possible food spillage									

Animal ID	Exposure Group	Replicate	Cohort	Food Consumption Weights (g)							<-- Pre-Exposure Days		Exposure Day
											-2	-1	
82	Intermediate	1	Acute									5.22	9.18
84	Intermediate	1	Acute									6.27	7.94
86	Intermediate	1	Recovery									8.86	9.77
88	Intermediate	1	Recovery									7.10	8.65
90	Intermediate	2	Acute								7.32	8.60	11.77
92	Intermediate	2	Acute								6.24	8.31	11.52
94	Intermediate	2	Recovery								6.82	10.09	12.70
96	Intermediate	2	Recovery								8.23	9.27	11.39
98	Intermediate	3	Acute							8.43	10.46	14.35	14.35
100	Intermediate	3	Acute							7.15	8.99	12.14	11.19
102	Intermediate	3	Recovery							7.53	9.83	13.72	12.15
104	Intermediate	3	Recovery							5.02	9.43	10.24	10.48
106	Intermediate	4	Acute		7.41	9.61	10.29	13.28	10.05		31.71	10.57	9.56
108	Intermediate	4	Acute		7.34	8.08	9.75	10.62	6.85		35.62	11.87	9.82
110	Intermediate	4	Recovery		7.94	8.83	12.14	11.51	9.59		34.70	11.57	8.42
112	Intermediate	4	Recovery			5.55	7.96	13.89	10.30	11.25	30.62	10.21	10.63
114	Intermediate	5	Acute	6.13	10.78	11.81	12.36	10.95		35.66	11.89	10.00	10.43
116	Intermediate	5	Acute	6.00	9.88	11.05	12.78	9.46		33.75	11.25	9.36	11.80
118	Intermediate	5	Recovery	7.45	10.55	12.08	11.08	10.14		31.18	10.39	11.92	9.13
120	Intermediate	5	Recovery	8.54	6.25	9.98	9.54	9.10		31.12	10.37	9.12	9.17
122	High	1	Acute									8.12	8.93
124	High	1	Acute									7.43	8.82
126	High	1	Recovery									6.84	8.33
128	High	1	Recovery									8.75	7.35
130	High	2	Acute								6.82	8.12	11.43
132	High	2	Acute								7.29	7.97	11.82
134	High	2	Recovery								7.45	9.23	12.51
136	High	2	Recovery								8.05	8.15	12.70
138	High	3	Acute							7.72	10.60	12.45	14.10
140	High	3	Acute							6.90	9.12	13.24	12.45
142	High	3	Recovery							7.61	8.68	11.95	12.05
144	High	3	Recovery							8.11	9.40	13.15	11.50
146	High	4	Acute		7.28	8.76	10.75	13.21	9.02		31.37	10.46	10.61
148	High	4	Acute		7.60	8.67	12.28	10.98	9.79		31.69	10.56	9.32
150	High	4	Recovery		8.20	9.21	12.98	12.96	11.46		32.04	10.68	11.46
152	High	4	Recovery		7.90	9.50	11.88	11.36	8.84		31.88	10.63	8.71
154	High	5	Acute	8.60	9.48	12.71	13.05	9.80		31.50	10.50	11.52	10.09
156	High	5	Acute	7.79	10.73	10.81	10.94	10.78		34.60	11.53	10.51	11.07
158	High	5	Recovery	6.93	10.12	12.77	11.88	12.35		34.59	11.53	10.16	11.17
160	High	5	Recovery	7.03	10.41	11.50	12.29	11.24		36.27	12.09	10.84	10.19

Animal	Post-Exposure Days -->													
ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
82	7.73													
84	7.36													
86	4.47	9.05	10.67		31.14	10.38	9.70	10.46	10.92	11.12		35.30	11.77	2.34
88	7.81	10.23	9.24		30.51	10.17	8.90	8.57	9.67	11.19		33.15	11.05	1.33
90	6.34													
92	8.21													
94	7.64	11.42		31.07	10.36	11.59	10.01	12.53	11.28		38.30	12.77	10.13	NDR
96	8.59	11.68		34.03	11.34	12.65	10.92	11.08	12.15		41.35	13.78	12.22	NDR
98	3.37													
100	2.83													
102	8.19		32.67	10.89	9.58	6.00	12.68	11.99		37.51	12.50	12.14	11.28	NDR
104	6.82		29.30	9.77	9.38	10.40	10.24	10.30		36.13	12.04	10.37	9.87	NDR
106	6.03													
108	5.57													
110	6.68	9.47	10.69		37.14	12.38	11.41	12.47	9.96	9.84		36.81	12.27	NDR
112	3.91	8.08	11.60		36.13	12.04	10.56	11.47	10.49	9.86		34.09	11.36	NDR
114	8.29													
116	2.03													
118	7.69	12.05		34.20	11.40	11.17	11.38	11.41	9.15		34.84	11.61	9.47	NDR
120	5.94	9.48		25.20	8.40	11.18	12.48	11.17	9.68		34.13	11.38	9.31	NDR
122	5.01													
124	8.04													
126	3.27	10.21	8.73		29.98	9.99	8.24	9.71	11.15	10.00		33.65	11.22	3.36
128	3.49	9.43	10.33		31.30	10.43	12.27	11.65	12.30	12.31		37.87	12.62	2.38
130	2.52													
132	3.78													
134	4.36	10.21		30.84	10.28	10.03	9.53	11.61	10.52		35.07	11.69	9.78	NDR
136	1.75	6.88		32.04	10.68	11.54	9.09	10.66	11.74		34.88	11.63	9.70	NDR
138	0.62													
140	2.71													
142			29.91	9.97	11.52	11.61	10.76	11.61		37.91	12.64	9.56	12.47	NDR
144	3.55		32.99	11.00	11.15	11.22	11.51	12.34		37.13	12.38	9.67	9.17	NDR
146	0.34													
148	0.65													
150	5.55	9.58	10.46		34.39	11.46	12.10	11.89	10.95	11.38		35.44	11.81	NDR
152	2.43	9.53	10.72		36.01	12.00	10.30	13.05	11.08	11.27		34.53	11.51	NDR
154	1.27													
156	2.77													
158	5.72	10.63		34.36	11.45	9.85	11.51	11.88	11.64		38.13	12.71	10.16	NDR
160	4.66	12.44		35.14	11.71	11.40	13.64	12.18	12.77		38.54	12.85	11.39	NDR
	NDR =no data recorded													

## APPENDIX F. ACUTE EXPOSURE STUDY ORGAN WEIGHT DATA

### Acute Cohort Male and Female Necropsy Weight Data

#### Control Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
1	R1	172.09	1.752	0.679	0.642	0.034	6.801
2	R1	118.69	1.609	0.505	0.520	0.044	4.760
3	R1	177.60	1.798	0.708	0.707	0.042	7.828
4	R1	127.40	1.683	0.539	0.526	0.035	4.887
9	R2	167.89	1.761	0.647	0.654	0.038	6.972
10	R2	126.37	1.647	0.510	0.526	0.040	5.234
11	R2	194.48	1.799	0.752	0.707	0.031	8.129
12	R2	121.59	1.672	0.499	0.506	0.042	4.555
17	R3	185.86	1.814	0.698	0.732	0.036	8.277
18	R3	125.11	1.675	0.512	0.525	0.047	4.996
19	R3	183.59	1.751	0.658	0.673	0.036	8.162
20	R3	133.16	1.699	0.583	0.555	0.046	5.114
25	R4	202.13	1.782	0.759	0.752	0.039	8.984
26	R4	146.90	1.628	0.593	0.591	0.048	5.634
27	R4	207.15	1.745	0.811	0.803	0.036	10.450
28	R4	132.16	1.655	0.505	0.500	0.039	5.500
33	R5	198.38	1.823	0.736	0.741	0.034	8.689
34	R5	138.74	1.690	0.527	0.519	0.053	5.273
35	R5	209.79	1.764	0.765	0.765	0.034	8.673
36	R5	141.00	1.793	0.560	0.538	0.046	5.193
Mean		160.50	1.727	0.627	0.624	0.040	6.706
SD		32.40	0.066	0.106	0.104	0.006	1.796
SEM		7.25	0.015	0.024	0.023	0.001	0.401
Male Statistics							
Mean		189.90	1.779	0.721	0.718	0.036	8.297
SD		14.70	0.028	0.052	0.051	0.003	1.036
SEM		4.65	0.009	0.017	0.016	0.001	0.328
Female Statistics							
Mean		131.11	1.675	0.533	0.531	0.044	5.115
SD		8.99	0.050	0.034	0.026	0.005	0.328
SEM		2.84	0.016	0.011	0.008	0.002	0.104
Mottled appearance on lungs							

# Low Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
41	R1	169.31	1.677	0.701	0.719	0.037	7.264
42	R1	112.57	1.535	0.422	0.434	0.039	3.966
43	R1	186.60	1.816	0.780	0.794	0.032	8.359
44	R1	122.85	1.660	0.480	0.488	0.042	4.573
49	R2	166.08	1.616	0.595	0.607	0.038	6.689
50	R2	130.00	1.685	0.525	0.516	0.050	5.298
51	R2	198.18	1.828	0.798	0.798	0.022	8.903
52	R2	126.64	1.652	0.552	0.549	0.024	5.057
57	R3	196.11	1.736	0.800	0.781	0.016	9.088
58	R3	141.45	1.659	0.542	0.515	0.042	5.348
59	R3	192.64	1.823	0.782	0.780	0.047	7.962
60	R3	129.73	1.713	0.498	0.521	0.045	4.874
65	R4	206.33	1.772	0.842	0.785	0.038	8.725
66	R4	132.96	1.730	0.501	0.515	0.045	5.204
67	R4	204.22	1.797	0.733	0.732	0.036	8.556
68	R4	143.07	1.634	0.552	0.569	0.038	5.432
73	R5	214.56	1.870	0.867	0.865	0.046	9.490
74	R5	136.82	1.734	0.540	0.549	0.052	5.372
75	R5	189.82	1.811	0.668	0.691	0.043	7.495
76	R5	144.49	1.783	0.544	0.524	0.044	5.577
Mean		162.22	1.727	0.636	0.637	0.039	6.662
SD		33.42	0.086	0.139	0.134	0.009	1.775
SEM		7.47	0.019	0.031	0.030	0.002	0.397
Male Statistics							
Mean		192.39	1.775	0.757	0.755	0.036	8.253
SD		15.41	0.077	0.083	0.071	0.010	0.886
SEM		4.87	0.024	0.026	0.022	0.003	0.280
Female Statistics							
Mean		132.06	1.679	0.516	0.518	0.042	5.070
SD		9.95	0.068	0.041	0.037	0.008	0.487
SEM		3.15	0.022	0.013	0.012	0.002	0.154
Mottled appearance on lungs							

# Intermediate Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
81	R1	166.95	1.704	0.662	0.664	0.037	7.804
82	R1	116.20	1.640	0.526	0.516	0.047	4.679
83	R1	179.53	1.669	0.661	0.646	0.030	7.438
84	R1	117.08	1.606	0.478	0.481	0.048	4.404
89	R2	168.23	1.836	0.626	0.680	0.038	6.400
90	R2	120.48	1.649	0.487	0.497	0.035	4.642
91	R2	184.93	1.828	0.727	0.731	0.035	7.353
92	R2	126.88	1.629	0.489	0.446	0.043	4.815
97	R3	180.58	1.838	*	*	0.037	7.276
98	R3	120.96	1.686	0.505	0.471	0.040	4.706
99	R3	192.11	1.798	0.751	0.764	0.045	8.270
100	R3	124.02	1.737	0.481	0.495	0.048	4.511
105	R4	190.62	1.820	0.703	0.707	0.040	8.258
106	R4	132.48	1.735	0.500	0.536	0.056	5.057
107	R4	186.32	1.788	0.749	0.698	0.033	8.397
108	R4	124.65	1.727	0.486	0.496	0.053	4.812
113	R5	190.67	1.754	0.725	0.757	0.020	8.068
114	R5	146.92	1.710	0.547	0.584	0.054	5.836
115	R5	190.37	1.830	0.627	0.620	0.033	7.405
116	R5	123.37	1.755	0.470	0.462	0.046	4.245
Mean		154.17	1.737	0.589	0.592	0.041	6.219
SD		30.90	0.075	0.107	0.110	0.009	1.574
SEM		6.91	0.017	0.025	0.025	0.002	0.352
Male Statistics							
Mean		183.03	1.787	0.692	0.696	0.035	7.667
SD		9.21	0.059	0.050	0.049	0.007	0.615
SEM		2.91	0.019	0.017	0.016	0.002	0.194
Female Statistics							
Mean		125.30	1.687	0.497	0.498	0.047	4.771
SD		8.94	0.053	0.024	0.040	0.006	0.438
SEM		2.83	0.017	0.007	0.013	0.002	0.139

Mottled appearance on lungs

\* Organs put in formalin before weight recorded



# High Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
121	R1	153.35	1.766	0.642	0.637	0.039	6.146
122	R1	113.73	1.567	0.441	0.441	0.048	4.220
123	R1	161.33	1.731	0.602	0.588	0.036	6.672
124	R1	114.76	1.613	0.474	0.451	0.048	4.208
129	R2	139.99	1.734	0.523	0.527	0.040	5.244
130	R2	*	*	*	*	*	*
131	R2	170.72	1.815	0.719	0.762	0.018	6.934
132	R2	115.90	1.629	0.508	0.523	0.034	4.490
137	R3	176.24	1.813	0.749	0.705	0.045	7.910
138	R3	123.83	1.849	0.498	0.495	0.057	4.514
139	R3	179.74	1.858	0.620	0.672	0.032	7.130
140	R3	111.40	1.742	0.504	0.487	0.058	4.151
145	R4	191.44	1.885	0.748	0.756	0.039	7.752
146	R4	123.74	1.679	0.475	0.469	0.053	4.067
147	R4	187.27	1.771	0.706	0.712	0.024	7.314
148	R4	127.36	1.683	0.550	0.570	0.056	4.657
153	R5	186.24	1.769	0.710	0.657	0.039	7.079
154	R5	129.13	1.690	0.490	0.457	0.040	4.819
155	R5	200.61	1.832	0.792	0.726	0.045	7.505
156	R5	120.68	1.603	0.453	0.484	0.038	4.512
Mean		148.81	1.738	0.590	0.585	0.042	5.754
SD		31.26	0.093	0.117	0.113	0.011	1.441
SEM		7.17	0.021	0.027	0.026	0.002	0.330
Male Statistics							
Mean		174.69	1.797	0.681	0.674	0.036	6.969
SD		18.64	0.052	0.082	0.075	0.009	0.795
SEM		5.89	0.016	0.026	0.024	0.003	0.251
Female Statistics							
Mean		120.06	1.673	0.488	0.486	0.048	4.404
SD		6.37	0.085	0.032	0.040	0.009	0.254
SEM		2.12	0.028	0.011	0.013	0.003	0.085

Mottled appearance on lungs

Significantly different from control (p <= 0.05)

Low vs. High (p <= 0.05)

Significantly different Control vs. High & Low vs. High

\* Organs put in formalin before weight recorded

## Recovery Cohort Male and Female Necropsy Weight Data

### Control Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
5	R1(R)	215.22	1.777	0.769	0.813	0.044	8.242
6	R1(R)	120.73	1.689	0.481	0.478	0.041	3.481
7	R1(R)	217.28	1.701	0.800	0.716	0.041	7.219
8	R1(R)	128.64	1.717	0.464	0.463	0.050	3.771
13	R2(R)	244.87	1.776	0.893	0.867	0.047	10.155
14	R2(R)	127.46	1.659	0.538	0.528	0.058	4.654
15	R2(R)	224.71	1.868	0.793	0.772	0.042	7.907
16	R2(R)	137.10	1.685	0.495	0.482	0.045	4.224
21	R3(R)	226.63	1.930	0.857	0.796	0.045	7.715
22	R3(R)	139.38	1.707	0.484	0.515	0.044	4.360
23	R3(R)	216.67	1.810	0.780	0.787	0.050	7.654
24	R3(R)	149.09	1.776	0.525	0.516	0.051	4.615
29	R4(R)	229.06	1.848	0.771	0.798	0.046	7.935
30	R4(R)	142.68	1.656	0.525	0.554	0.053	4.579
31	R4(R)	227.44	1.770	0.820	0.759	0.047	8.960
32	R4(R)	141.23	1.701	0.515	0.513	0.055	4.648
37	R5(R)	223.11	1.806	0.792	0.819	0.044	7.858
38	R5(R)	144.33	1.750	0.533	0.550	0.049	4.683
39	R5(R)	237.09	1.843	0.842	0.798	0.019	8.921
40	R5(R)	146.17	1.699	0.520	0.502	0.053	4.444
Mean		181.94	1.758	0.660	0.651	0.046	6.301
SD		46.30	0.075	0.159	0.149	0.008	2.111
SEM		10.35	0.017	0.036	0.033	0.002	0.472
Male Statistics							
Mean		226.21	1.813	0.812	0.793	0.043	8.257
SD		9.31	0.063	0.041	0.040	0.009	0.860
SEM		2.94	0.020	0.013	0.013	0.003	0.272
Female Statistics							
Mean		137.68	1.704	0.508	0.510	0.050	4.346
SD		9.19	0.037	0.025	0.030	0.005	0.412
SEM		2.91	0.012	0.008	0.009	0.002	0.130

# Low Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
45	R1(R)	209.89	1.810	0.794	0.798	0.048	6.970
46	R1(R)	133.67	1.580	0.491	0.475	0.047	4.085
47	R1(R)	208.00	1.830	0.757	0.749	0.042	6.309
48	R1(R)	129.59	1.707	0.457	0.475	0.041	3.950
53	R2(R)	208.32	1.874	0.720	0.710	0.050	7.334
54	R2(R)	147.46	1.677	0.497	0.496	0.051	4.536
55	R2(R)	223.88	1.844	0.758	0.733	0.052	7.451
56	R2(R)	157.08	1.735	0.511	0.560	0.053	4.626
61	R3(R)	207.22	1.704	0.843	0.782	0.047	8.034
62	R3(R)	135.43	1.680	0.490	0.477	0.042	4.217
63	R3(R)	198.18	1.815	0.778	0.742	0.043	8.241
64	R3(R)	152.89	1.698	0.515	0.533	0.054	4.777
69	R4(R)	235.00	1.813	0.838	0.839	0.057	8.480
70	R4(R)	153.90	1.690	0.566	0.559	0.056	4.646
71	R4(R)	213.29	1.773	0.740	0.789	0.036	7.007
72	R4(R)	146.93	1.694	0.570	0.550	0.054	4.637
77	R5(R)	229.90	1.852	0.760	0.775	0.032	7.982
78	R5(R)	147.44	1.704	0.516	0.516	0.043	4.539
79	R5(R)	224.44	1.889	0.786	0.762	0.042	8.041
80	R5(R)	139.17	1.660	0.500	0.484	0.044	4.674
Mean		180.08	1.751	0.644	0.640	0.047	6.027
SD		38.09	0.084	0.141	0.136	0.007	1.678
SEM		8.52	0.019	0.032	0.030	0.002	0.375
Male Statistics							
Mean		215.81	1.820	0.777	0.768	0.045	7.585
SD		11.78	0.053	0.040	0.037	0.007	0.685
SEM		3.73	0.017	0.013	0.012	0.002	0.217
Female Statistics							
Mean		144.36	1.683	0.511	0.513	0.049	4.469
SD		9.37	0.041	0.034	0.036	0.006	0.281
SEM		2.96	0.013	0.011	0.011	0.002	0.089

# Intermediate Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
85	R1(R)	201.67	1.863	0.719	0.697	0.039	6.390
86	R1(R)	134.67	1.715	0.486	0.465	0.052	3.948
87	R1(R)	193.59	1.766	0.686	0.690	0.035	6.325
88	R1(R)	128.23	1.703	0.495	0.481	0.051	4.177
93	R2(R)	201.51	1.842	0.721	0.739	0.023	7.316
94	R2(R)	143.01	1.781	0.480	0.536	0.054	4.784
95	R2(R)	215.07	1.820	0.851	0.801	0.040	9.119
96	R2(R)	151.10	1.676	0.531	0.558	0.041	5.126
101	R3(R)	212.16	1.814	0.736	0.724	0.046	7.911
102	R3(R)	140.03	1.693	0.501	0.506	0.047	4.866
103	R3(R)	225.02	1.895	0.807	0.791	0.042	7.489
104	R3(R)	129.44	1.697	0.480	0.494	0.051	4.224
109	R4(R)	218.09	1.750	0.791	0.782	0.051	7.942
110	R4(R)	145.43	1.629	0.488	0.504	0.043	4.458
111	R4(R)	224.47	1.750	0.842	0.834	0.047	8.787
112	R4(R)	132.18	1.638	0.487	0.495	0.044	4.093
117	R5(R)	228.89	1.856	0.806	0.751	0.042	8.171
118	R5(R)	147.85	1.680	0.505	0.493	0.043	4.421
119	R5(R)	246.40	1.803	0.814	0.836	0.043	8.285
120	R5(R)	128.80	1.606	0.465	0.482	0.044	4.065
Mean		177.38	1.749	0.635	0.633	0.044	6.095
SD		42.13	0.084	0.152	0.141	0.007	1.855
SEM		9.42	0.019	0.034	0.032	0.002	0.415
Male Statistics							
Mean		216.69	1.816	0.777	0.765	0.041	7.774
SD		15.55	0.050	0.057	0.053	0.008	0.919
SEM		4.92	0.016	0.018	0.017	0.002	0.291
Female Statistics							
Mean		138.07	1.682	0.492	0.501	0.047	4.416
SD		8.51	0.050	0.018	0.027	0.005	0.392
SEM		2.69	0.016	0.006	0.009	0.001	0.124

Mottled appearance on lungs

# High Exposure Group

Animal ID	Group	Final Weight	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
125	R1(R)	195.7	1.736	0.723	0.689	0.036	7.176
126	R1(R)	133.71	1.746	0.494	0.461	0.047	4.082
127	R1(R)	218.67	1.781	0.836	0.784	0.032	8.332
128	R1(R)	137.78	1.575	0.548	0.542	0.046	4.426
133	R2(R)	203.23	1.841	0.732	0.710	0.042	7.107
134	R2(R)	138.66	1.705	0.540	0.509	0.050	4.316
135	R2(R)	200.81	1.800	0.667	0.682	0.032	6.660
136	R2(R)	137.37	1.773	0.489	0.522	0.047	4.022
141	R3(R)	211.35	1.772	0.793	0.782	0.051	8.532
142	R3(R)	133.11	1.745	0.518	0.495	0.051	4.301
143	R3(R)	200.84	1.735	0.731	0.684	0.050	7.234
144	R3(R)	136.05	1.691	0.566	0.541	0.045	4.286
149	R4(R)	219.1	1.753	0.743	0.741	0.043	6.926
150	R4(R)	137.57	1.558	0.547	0.543	0.050	4.544
151	R4(R)	227.68	1.870	0.814	0.780	0.037	8.451
152	R4(R)	139.33	1.708	0.483	0.493	0.055	4.190
157	R5(R)	222.66	1.743	0.806	0.789	0.035	9.739
158	R5(R)	145.28	1.789	0.505	0.494	0.049	4.431
159	R5(R)	225.58	1.855	0.833	0.797	0.044	7.746
160	R5(R)	146.3	1.698	0.578	0.575	0.056	4.937
Mean		175.54	1.744	0.647	0.631	0.045	6.072
SD		38.94	0.078	0.132	0.123	0.007	1.891
SEM		8.71	0.018	0.029	0.027	0.002	0.423
Male Statistics							
Mean		212.56	1.789	0.768	0.744	0.040	7.790
SD		11.68	0.051	0.056	0.048	0.007	0.958
SEM		3.69	0.016	0.018	0.015	0.002	0.303
Female Statistics							
Mean		138.52	1.699	0.527	0.518	0.050	4.354
SD		4.32	0.077	0.034	0.033	0.004	0.260
SEM		1.37	0.024	0.011	0.011	0.001	0.082

Mottled appearance on lungs

## Acute Cohort Male and Female Organ:Body Weight Data

### Control Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
1	0.01018	0.00395	0.00373	0.00020	0.03952
2	0.01356	0.00425	0.00438	0.00037	0.04010
3	0.01012	0.00399	0.00398	0.00024	0.04408
4	0.01321	0.00423	0.00413	0.00027	0.03836
9	0.01049	0.00385	0.00390	0.00023	0.04153
10	0.01303	0.00404	0.00416	0.00032	0.04142
11	0.00925	0.00387	0.00364	0.00016	0.04180
12	0.01375	0.00410	0.00416	0.00035	0.03746
17	0.00976	0.00376	0.00394	0.00019	0.04453
18	0.01339	0.00409	0.00420	0.00038	0.03993
19	0.00954	0.00358	0.00367	0.00020	0.04446
20	0.01276	0.00438	0.00417	0.00035	0.03840
25	0.00882	0.00376	0.00372	0.00019	0.04445
26	0.01108	0.00404	0.00402	0.00033	0.03835
27	0.00842	0.00392	0.00388	0.00017	0.05045
28	0.01252	0.00382	0.00378	0.00030	0.04162
33	0.00919	0.00371	0.00374	0.00017	0.04380
34	0.01218	0.00380	0.00374	0.00038	0.03801
35	0.00841	0.00365	0.00365	0.00016	0.04134
36	0.01272	0.00397	0.00382	0.00033	0.03683

Mean	0.01112	0.00394	0.00392	0.00026	0.04132
SD	0.00189	0.00021	0.00022	0.00008	0.00329
SEM	0.00042	0.00005	0.00005	0.00002	0.00074

### Male Statistics

Mean	0.00942	0.00380	0.00378	0.00019	0.04359
SD	0.00073	0.00013	0.00013	0.00003	0.00296
SEM	0.00023	0.00004	0.00004	0.00001	0.00094

### Female Statistics

Mean	0.01282	0.00407	0.00406	0.00034	0.03905
SD	0.00078	0.00018	0.00021	0.00004	0.00163
SEM	0.00026	0.00006	0.00007	0.00001	0.00054

# Low Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
41	0.00990	0.00414	0.00425	0.00022	0.04290
42	0.01364	0.00375	0.00386	0.00035	0.03523
43	0.00973	0.00418	0.00426	0.00017	0.04480
44	0.01351	0.00391	0.00397	0.00034	0.03722
49	0.00973	0.00358	0.00365	0.00023	0.04028
50	0.01296	0.00404	0.00397	0.00038	0.04075
51	0.00922	0.00403	0.00403	0.00011	0.04492
52	0.01304	0.00436	0.00434	0.00019	0.03993
57	0.00885	0.00408	0.00398	0.00008	0.04634
58	0.01173	0.00383	0.00364	0.00030	0.03781
59	0.00946	0.00406	0.00405	0.00024	0.04133
60	0.01320	0.00384	0.00402	0.00035	0.03757
65	0.00859	0.00408	0.00380	0.00018	0.04229
66	0.01301	0.00377	0.00387	0.00034	0.03914
67	0.00880	0.00359	0.00358	0.00018	0.04190
68	0.01142	0.00386	0.00398	0.00027	0.03797
73	0.00872	0.00404	0.00403	0.00021	0.04423
74	0.01267	0.00395	0.00401	0.00038	0.03926
75	0.00954	0.00352	0.00364	0.00023	0.03948
76	0.01234	0.00376	0.00363	0.00030	0.03860
Mean	0.01100	0.00392	0.00393	0.00025	0.04060
SD	0.00189	0.00022	0.00022	0.00009	0.00296
SEM	0.00042	0.00005	0.00005	0.00002	0.00066
<b>Male Statistics</b>					
Mean	0.00926	0.00393	0.00393	0.00019	0.04285
SD	0.00048	0.00026	0.00024	0.00005	0.00220
SEM	0.00015	0.00008	0.00008	0.00002	0.00070
<b>Female Statistics</b>					
Mean	0.01275	0.00391	0.00393	0.00032	0.03835
SD	0.00073	0.00018	0.00020	0.00006	0.00156
SEM	0.00024	0.00006	0.00007	0.00002	0.00052

# Intermediate Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
81	0.01021	0.00397	0.00398	0.00022	0.04674
82	0.01411	0.00453	0.00444	0.00040	0.04027
83	0.00930	0.00368	0.00360	0.00017	0.04143
84	0.01372	0.00408	0.00411	0.00041	0.03762
89	0.01091	0.00372	0.00404	0.00023	0.03804
90	0.01369	0.00404	0.00413	0.00029	0.03853
91	0.00988	0.00393	0.00395	0.00019	0.03976
92	0.01284	0.00385	0.00352	0.00034	0.03795
97	0.01018	*	*	0.00020	0.04029
98	0.01394	0.00417	0.00389	0.00033	0.03891
99	0.00936	0.00391	0.00398	0.00023	0.04305
100	0.01401	0.00388	0.00399	0.00039	0.03637
105	0.00955	0.00369	0.00371	0.00021	0.04332
106	0.01310	0.00377	0.00405	0.00042	0.03817
107	0.00960	0.00402	0.00375	0.00018	0.04507
108	0.01385	0.00390	0.00398	0.00043	0.03860
113	0.00920	0.00380	0.00397	0.00010	0.04231
114	0.01164	0.00372	0.00397	0.00037	0.03972
115	0.00961	0.00329	0.00326	0.00017	0.03890
116	0.01423	0.00381	0.00374	0.00037	0.03441
Mean	0.01165	0.00388	0.00390	0.00028	0.03997
SD	0.00202	0.00388	0.00026	0.00010	0.00297
SEM	0.00045	0.00384	0.00006	0.00002	0.00066
<b>Male Statistics</b>					
Mean	0.00978	0.00378	0.00380	0.00019	0.04189
SD	0.00053	0.00022	0.00026	0.00004	0.00275
SEM	0.00017	0.00007	0.00009	0.00001	0.00087
<b>Female Statistics</b>					
Mean	0.01351	0.00398	0.00398	0.00037	0.03805
SD	0.00079	0.00024	0.00024	0.00004	0.00168
SEM	0.00026	0.00008	0.00008	0.00001	0.00056

\* Organs put in formalin before weight recorded



# High Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
121	0.01152	0.00419	0.00415	0.00025	0.04008
122	0.01378	0.00388	0.00388	0.00042	0.03711
123	0.01073	0.00373	0.00364	0.00022	0.04136
124	0.01406	0.00413	0.00393	0.00042	0.03667
129	0.01239	0.00374	0.00376	0.00029	0.03746
130	*	*	*	*	*
131	0.01063	0.00421	0.00446	0.00011	0.04062
132	0.01406	0.00438	0.00451	0.00029	0.03874
137	0.01029	0.00425	0.00400	0.00026	0.04488
138	0.01493	0.00402	0.00400	0.00046	0.03645
139	0.01034	0.00345	0.00374	0.00018	0.03967
140	0.01564	0.00452	0.00437	0.00052	0.03726
145	0.00985	0.00391	0.00395	0.00020	0.04049
146	0.01357	0.00384	0.00379	0.00043	0.03287
147	0.00946	0.00377	0.00380	0.00013	0.03906
148	0.01321	0.00432	0.00448	0.00044	0.03657
153	0.00950	0.00381	0.00353	0.00021	0.03801
154	0.01309	0.00379	0.00354	0.00031	0.03732
155	0.00913	0.00395	0.00362	0.00022	0.03741
156	0.01328	0.00375	0.00401	0.00031	0.03739
Mean	0.01208	0.00398	0.00396	0.00030	0.03839
SD	0.00204	0.00028	0.00031	0.00012	0.00251
SEM	0.00047	0.00006	0.00007	0.00003	0.00057

## Male Statistics

Mean	0.01038	0.00390	0.00387	0.00021	0.03990
SD	0.00100	0.00026	0.00028	0.00006	0.00222
SEM	0.00032	0.00008	0.00009	0.00002	0.00070

## Female Statistics

Mean	0.01396	0.00407	0.00406	0.00040	0.03671
SD	0.00085	0.00028	0.00033	0.00008	0.00159
SEM	0.00030	0.00010	0.00012	0.00003	0.00056

Significantly different from control (p <= 0.05)

Significantly different Low vs. High (p <=0.05)

Significantly different Control vs. High & Low vs. High

\* Organs put in formalin before weight recorded

## Recovery Cohort Male and Female Organ:Body Weight Data

### Control Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
5	0.00826	0.00357	0.00378	0.00020	0.03830
6	0.01399	0.00398	0.00396	0.00034	0.02883
7	0.00783	0.00368	0.00330	0.00019	0.03322
8	0.01335	0.00361	0.00360	0.00039	0.02931
13	0.00725	0.00365	0.00354	0.00019	0.04147
14	0.01302	0.00422	0.00414	0.00046	0.03651
15	0.00831	0.00353	0.00344	0.00019	0.03519
16	0.01229	0.00361	0.00352	0.00033	0.03081
21	0.00852	0.00378	0.00351	0.00020	0.03404
22	0.01225	0.00347	0.00369	0.00032	0.03128
23	0.00835	0.00360	0.00363	0.00023	0.03533
24	0.01191	0.00352	0.00346	0.00034	0.03095
29	0.00807	0.00337	0.00348	0.00020	0.03464
30	0.01161	0.00368	0.00388	0.00037	0.03209
31	0.00778	0.00361	0.00334	0.00021	0.03940
32	0.01204	0.00365	0.00363	0.00039	0.03291
37	0.00809	0.00355	0.00367	0.00020	0.03522
38	0.01212	0.00369	0.00381	0.00034	0.03245
39	0.00777	0.00355	0.00337	0.00008	0.03763
40	0.01162	0.00356	0.00343	0.00036	0.03040

Mean	0.01022	0.00364	0.00361	0.00028	0.03400
SD	0.00233	0.00018	0.00022	0.00010	0.00344
SEM	0.00052	0.00004	0.00005	0.00002	0.00077

### Male Statistics

Mean	0.00802	0.00359	0.00351	0.00019	0.03644
SD	0.00037	0.00011	0.00015	0.00004	0.00264
SEM	0.00012	0.00003	0.00005	0.00001	0.00083

### Female Statistics

Mean	0.01242	0.00370	0.00371	0.00036	0.03156
SD	0.00078	0.00023	0.00023	0.00004	0.00217
SEM	0.00026	0.00008	0.00008	0.00001	0.00072

# Low Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
45	0.00862	0.00378	0.00380	0.00023	0.03321
46	0.01182	0.00367	0.00355	0.00035	0.03056
47	0.00880	0.00364	0.00360	0.00020	0.03033
48	0.01317	0.00353	0.00367	0.00032	0.03048
53	0.00900	0.00346	0.00341	0.00024	0.03521
54	0.01137	0.00337	0.00336	0.00035	0.03076
55	0.00824	0.00339	0.00327	0.00023	0.03328
56	0.01105	0.00325	0.00357	0.00034	0.02945
61	0.00822	0.00407	0.00377	0.00023	0.03877
62	0.01240	0.00362	0.00352	0.00031	0.03114
63	0.00916	0.00393	0.00374	0.00022	0.04158
64	0.01111	0.00337	0.00349	0.00035	0.03124
69	0.00771	0.00357	0.00357	0.00024	0.03609
70	0.01098	0.00368	0.00363	0.00036	0.03019
71	0.00831	0.00347	0.00370	0.00017	0.03285
72	0.01153	0.00388	0.00374	0.00037	0.03156
77	0.00806	0.00331	0.00337	0.00014	0.03472
78	0.01156	0.00350	0.00350	0.00029	0.03079
79	0.00842	0.00350	0.00340	0.00019	0.03583
80	0.01193	0.00359	0.00348	0.00032	0.03358
Mean	0.01007	0.00358	0.00356	0.00027	0.03308
SD	0.00175	0.00021	0.00015	0.00007	0.00317
SEM	0.00039	0.00005	0.00003	0.00002	0.00071
<b>Male Statistics</b>					
Mean	0.00845	0.00361	0.00356	0.00021	0.03519
SD	0.00044	0.00024	0.00019	0.00003	0.00319
SEM	0.00014	0.00008	0.00006	0.00001	0.00101
<b>Female Statistics</b>					
Mean	0.01169	0.00355	0.00355	0.00034	0.03098
SD	0.00068	0.00018	0.00011	0.00003	0.00109
SEM	0.00023	0.00006	0.00004	0.00001	0.00036

**Intermediate Exposure Group**

<b>Animal ID</b>	<b>Brain: BW</b>	<b>Kidney, Left: BW</b>	<b>Kidney, Right: BW</b>	<b>Adrenals: BW</b>	<b>Liver: BW</b>
<b>85</b>	0.00924	0.00357	0.00346	0.00019	0.03169
<b>86</b>	0.01273	0.00361	0.00345	0.00039	0.02932
<b>87</b>	0.00912	0.00354	0.00356	0.00018	0.03267
<b>88</b>	0.01328	0.00386	0.00375	0.00040	0.03257
<b>93</b>	0.00914	0.00358	0.00367	0.00011	0.03631
<b>94</b>	0.01245	0.00336	0.00375	0.00038	0.03345
<b>95</b>	0.00846	0.00396	0.00372	0.00019	0.04240
<b>96</b>	0.01109	0.00351	0.00369	0.00027	0.03392
<b>101</b>	0.00855	0.00347	0.00341	0.00022	0.03729
<b>102</b>	0.01209	0.00358	0.00361	0.00034	0.03475
<b>103</b>	0.00842	0.00359	0.00352	0.00019	0.03328
<b>104</b>	0.01311	0.00371	0.00382	0.00039	0.03263
<b>109</b>	0.00802	0.00363	0.00359	0.00023	0.03642
<b>110</b>	0.01120	0.00336	0.00347	0.00030	0.03065
<b>111</b>	0.00780	0.00375	0.00372	0.00021	0.03915
<b>112</b>	0.01239	0.00368	0.00374	0.00033	0.03097
<b>117</b>	0.00811	0.00352	0.00328	0.00018	0.03570
<b>118</b>	0.01136	0.00342	0.00333	0.00029	0.02990
<b>119</b>	0.00732	0.00330	0.00339	0.00017	0.03362
<b>120</b>	0.01247	0.00361	0.00374	0.00034	0.03156
<b>Mean</b>	0.01032	0.00358	0.00358	0.00027	0.03391
<b>SD</b>	0.00207	0.00358	0.00016	0.00009	0.00324
<b>SEM</b>	0.00046	0.00358	0.00004	0.00002	0.00072
<b>Male Statistics</b>					
<b>Mean</b>	0.00842	0.00359	0.00353	0.00019	0.03585
<b>SD</b>	0.00063	0.00017	0.00015	0.00003	0.00326
<b>SEM</b>	0.00020	0.00005	0.00005	0.00001	0.00103
<b>Female Statistics</b>					
<b>Mean</b>	0.01222	0.00357	0.00364	0.00034	0.03197
<b>SD</b>	0.00077	0.00016	0.00016	0.00005	0.00179
<b>SEM</b>	0.00026	0.00005	0.00005	0.00002	0.00060

# High Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
125	0.00887	0.00369	0.00352	0.00018	0.03667
126	0.01306	0.00369	0.00345	0.00035	0.03053
127	0.00814	0.00382	0.00359	0.00015	0.03810
128	0.01143	0.00398	0.00393	0.00033	0.03212
133	0.00906	0.00360	0.00349	0.00021	0.03497
134	0.01230	0.00389	0.00367	0.00036	0.03113
135	0.00896	0.00332	0.00340	0.00016	0.03317
136	0.01291	0.00356	0.00380	0.00034	0.02928
141	0.00838	0.00375	0.00370	0.00024	0.04037
142	0.01311	0.00389	0.00372	0.00038	0.03231
143	0.00864	0.00364	0.00341	0.00025	0.03602
144	0.01243	0.00416	0.00398	0.00033	0.03150
149	0.00800	0.00339	0.00338	0.00020	0.03161
150	0.01133	0.00398	0.00395	0.00036	0.03303
151	0.00821	0.00358	0.00343	0.00016	0.03712
152	0.01226	0.00347	0.00354	0.00039	0.03007
157	0.00783	0.00362	0.00354	0.00016	0.04374
158	0.01231	0.00348	0.00340	0.00034	0.03050
159	0.00822	0.00369	0.00353	0.00020	0.03434
160	0.01161	0.00395	0.00393	0.00038	0.03375
Mean	0.01035	0.00371	0.00362	0.00027	0.03402
SD	0.00204	0.00022	0.00020	0.00009	0.00373
SEM	0.00046	0.00005	0.00005	0.00002	0.00083
Male Statistics					
Mean	0.00843	0.00361	0.00350	0.00019	0.03661
SD	0.00043	0.00015	0.00010	0.00004	0.00354
SEM	0.00013	0.00005	0.00003	0.00001	0.00112
Female Statistics					
Mean	0.01227	0.00380	0.00374	0.00036	0.03142
SD	0.00065	0.00024	0.00022	0.00002	0.00139
SEM	0.00022	0.00008	0.00007	0.00001	0.00046
Significantly different Low vs. High (p <=0.05)					

## Acute Cohort Male and Female Organ:Brain Weight Data

### Control Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
1	0.388	0.366	0.019	3.882
2	0.314	0.323	0.027	2.958
3	0.394	0.393	0.023	4.354
4	0.320	0.313	0.021	2.904
9	0.367	0.371	0.022	3.959
10	0.310	0.319	0.024	3.178
11	0.418	0.393	0.017	4.519
12	0.298	0.303	0.025	2.724
17	0.385	0.404	0.020	4.563
18	0.306	0.313	0.028	2.983
19	0.376	0.384	0.021	4.661
20	0.343	0.327	0.027	3.010
25	0.426	0.422	0.022	5.042
26	0.364	0.363	0.029	3.461
27	0.465	0.460	0.021	5.989
28	0.305	0.302	0.024	3.323
33	0.404	0.406	0.019	4.766
34	0.312	0.307	0.031	3.120
35	0.434	0.434	0.019	4.917
36	0.312	0.300	0.026	2.896

Mean	0.362	0.360	0.023	3.860
SD	0.051	0.050	0.004	0.934
SEM	0.011	0.011	0.001	0.209

#### Male Statistics

Mean	0.406	0.403	0.020	4.665
SD	0.030	0.029	0.002	0.597
SEM	0.009	0.009	0.001	0.189

#### Female Statistics

Mean	0.318	0.317	0.026	3.056
SD	0.020	0.019	0.003	0.219
SEM	0.007	0.006	0.001	0.073

### Low Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
41	0.418	0.429	0.022	4.332
42	0.275	0.283	0.025	2.584
43	0.430	0.437	0.018	4.603
44	0.289	0.294	0.025	2.755
49	0.368	0.376	0.024	4.139
50	0.312	0.306	0.030	3.144
51	0.437	0.437	0.012	4.870
52	0.334	0.332	0.015	3.061
57	0.461	0.450	0.009	5.235
58	0.327	0.310	0.025	3.224
59	0.429	0.428	0.026	4.368
60	0.291	0.304	0.026	2.845
65	0.475	0.443	0.021	4.924
66	0.290	0.298	0.026	3.008
67	0.408	0.407	0.020	4.761
68	0.338	0.348	0.023	3.324
73	0.464	0.463	0.025	5.075
74	0.311	0.317	0.030	3.098
75	0.369	0.382	0.024	4.139
76	0.305	0.294	0.025	3.128

Mean	0.366	0.367	0.023	3.831
SD	0.068	0.064	0.005	0.890
SEM	0.015	0.014	0.001	0.199

#### Male Statistics

Mean	0.426	0.425	0.020	4.645
SD	0.037	0.028	0.006	0.389
SEM	0.012	0.009	0.002	0.123

#### Female Statistics

Mean	0.307	0.309	0.025	3.017
SD	0.021	0.020	0.004	0.226
SEM	0.007	0.007	0.001	0.075

### Intermediate Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
81	0.388	0.390	0.022	4.580
82	0.321	0.315	0.029	2.853
83	0.396	0.387	0.018	4.457
84	0.298	0.300	0.030	2.742
89	0.341	0.370	0.021	3.486
90	0.295	0.301	0.021	2.815
91	0.398	0.400	0.019	4.022
92	0.300	0.274	0.026	2.956
97	*	*	0.020	3.959
98	0.300	0.279	0.024	2.791
99	0.418	0.425	0.025	4.600
100	0.277	0.285	0.028	2.597
105	0.386	0.388	0.022	4.537
106	0.288	0.309	0.032	2.915
107	0.419	0.390	0.018	4.696
108	0.281	0.287	0.031	2.786
113	0.413	0.432	0.011	4.600
114	0.320	0.342	0.032	3.413
115	0.343	0.339	0.018	4.046
116	0.268	0.263	0.026	2.419

Mean	0.339	0.341	0.024	3.563
SD	0.054	0.055	0.006	0.821
SEM	0.012	0.013	0.001	0.184

### Male Statistics

Mean	0.389	0.391	0.019	4.298
SD	0.029	0.028	0.004	0.397
SEM	0.010	0.009	0.001	0.125

### Female Statistics

Mean	0.295	0.295	0.028	2.829
SD	0.017	0.023	0.004	0.258
SEM	0.006	0.008	0.001	0.086

Significantly different from control (p <= 0.05)

\* Organs put in formalin before weight recorded

### High Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
121	0.364	0.361	0.022	3.480
122	0.281	0.281	0.031	2.693
123	0.348	0.340	0.021	3.854
124	0.294	0.280	0.030	2.609
129	0.302	0.304	0.023	3.024
130	*	*	*	*
131	0.396	0.420	0.010	3.820
132	0.312	0.321	0.021	2.756
137	0.413	0.389	0.025	4.363
138	0.269	0.268	0.031	2.441
139	0.334	0.362	0.017	3.837
140	0.289	0.280	0.033	2.383
145	0.397	0.401	0.021	4.112
146	0.283	0.279	0.032	2.422
147	0.399	0.402	0.014	4.130
148	0.327	0.339	0.033	2.767
153	0.401	0.371	0.022	4.002
154	0.290	0.270	0.024	2.851
155	0.432	0.396	0.025	4.097
156	0.283	0.302	0.024	2.815

Mean	0.338	0.335	0.024	3.287
SD	0.054	0.052	0.006	0.699
SEM	0.012	0.012	0.001	0.160

### Male Statistics

Mean	0.379	0.375	0.020	3.872
SD	0.040	0.035	0.005	0.381
SEM	0.013	0.011	0.002	0.121

### Female Statistics

Mean	0.292	0.291	0.029	2.638
SD	0.017	0.024	0.005	0.181
SEM	0.006	0.009	0.002	0.064

Significantly different from control (p <= 0.05)

Significantly different Low vs. High (p <= 0.05)

Significantly different Control vs. High & Low vs. High

\* Organs put in formalin before weight recorded

## Recovery Cohort Male and Female Organ:Brain Weight Data

### Control Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
5	0.433	0.458	0.0248	4.638
6	0.285	0.283	0.0243	2.061
7	0.470	0.421	0.0241	4.244
8	0.270	0.270	0.0291	2.196
13	0.503	0.488	0.0265	5.718
14	0.324	0.318	0.0350	2.805
15	0.425	0.413	0.0225	4.233
16	0.294	0.286	0.0267	2.507
21	0.444	0.412	0.0233	3.997
22	0.284	0.302	0.0258	2.554
23	0.431	0.435	0.0276	4.229
24	0.296	0.291	0.0287	2.599
29	0.417	0.432	0.0249	4.294
30	0.317	0.335	0.0320	2.765
31	0.463	0.429	0.0266	5.062
32	0.303	0.302	0.0323	2.733
37	0.439	0.453	0.0244	4.351
38	0.305	0.314	0.0280	2.676
39	0.457	0.433	0.0103	4.840
40	0.306	0.295	0.0312	2.616

Mean	0.373	0.368	0.0264	3.556
SD	0.080	0.074	0.0050	1.104
SEM	0.018	0.016	0.0011	0.247

#### Male Statistics

Mean	0.448	0.437	0.023	4.561
SD	0.026	0.023	0.005	0.519
SEM	0.008	0.007	0.002	0.164

#### Female Statistics

Mean	0.298	0.300	0.029	2.551
SD	0.016	0.019	0.003	0.243
SEM	0.005	0.006	0.001	0.081

### Low Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
45	0.439	0.441	0.0265	3.851
46	0.311	0.301	0.0297	2.585
47	0.414	0.409	0.0230	3.448
48	0.268	0.278	0.0240	2.314
53	0.384	0.379	0.0267	3.914
54	0.296	0.296	0.0304	2.705
55	0.411	0.398	0.0282	4.041
56	0.295	0.323	0.0305	2.666
61	0.495	0.459	0.0276	4.715
62	0.292	0.284	0.0250	2.510
63	0.429	0.409	0.0237	4.540
64	0.303	0.314	0.0318	2.813
69	0.462	0.463	0.0314	4.677
70	0.335	0.331	0.0331	2.749
71	0.417	0.445	0.0203	3.952
72	0.336	0.325	0.0319	2.737
77	0.410	0.418	0.0173	4.310
78	0.303	0.303	0.0252	2.664
79	0.416	0.403	0.0222	4.257
80	0.301	0.292	0.0265	2.816

Mean	0.366	0.363	0.0268	3.413
SD	0.068	0.065	0.0042	0.832
SEM	0.015	0.014	0.0009	0.186

#### Male Statistics

Mean	0.428	0.422	0.025	4.170
SD	0.031	0.028	0.004	0.404
SEM	0.010	0.009	0.001	0.128

#### Female Statistics

Mean	0.304	0.305	0.029	2.656
SD	0.020	0.018	0.003	0.153
SEM	0.007	0.006	0.001	0.051



### Intermediate Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
85	0.386	0.374	0.0209	3.430
86	0.283	0.271	0.0303	2.302
87	0.388	0.391	0.0198	3.582
88	0.291	0.282	0.0299	2.453
93	0.391	0.401	0.0125	3.972
94	0.270	0.301	0.0303	2.686
95	0.468	0.440	0.0220	5.010
96	0.317	0.333	0.0245	3.058
101	0.406	0.399	0.0254	4.361
102	0.296	0.299	0.0278	2.874
103	0.426	0.417	0.0222	3.952
104	0.283	0.291	0.0301	2.489
109	0.452	0.447	0.0291	4.538
110	0.300	0.309	0.0264	2.737
111	0.481	0.477	0.0269	5.021
112	0.297	0.302	0.0269	2.499
117	0.434	0.405	0.0226	4.402
118	0.301	0.293	0.0256	2.632
119	0.451	0.464	0.0238	4.595
120	0.290	0.300	0.0274	2.531

Mean	0.361	0.360	0.0252	3.456
SD	0.074	0.068	0.0044	0.943
SEM	0.017	0.015	0.0010	0.211

#### Male Statistics

Mean	0.428	0.421	0.023	4.286
SD	0.035	0.034	0.005	0.546
SEM	0.011	0.011	0.001	0.173

#### Female Statistics

Mean	0.293	0.298	0.028	2.626
SD	0.013	0.016	0.002	0.222
SEM	0.004	0.005	0.001	0.074

### High Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
125	0.416	0.397	0.0207	4.134
126	0.283	0.264	0.0269	2.338
127	0.469	0.440	0.0180	4.678
128	0.348	0.344	0.0292	2.810
133	0.398	0.386	0.0228	3.860
134	0.317	0.299	0.0293	2.531
135	0.371	0.379	0.0178	3.700
136	0.276	0.294	0.0265	2.268
141	0.448	0.441	0.0288	4.815
142	0.297	0.284	0.0292	2.465
143	0.421	0.394	0.0288	4.169
144	0.335	0.320	0.0266	2.535
149	0.424	0.423	0.0245	3.951
150	0.351	0.349	0.0321	2.917
151	0.435	0.417	0.0198	4.519
152	0.283	0.289	0.0322	2.453
157	0.462	0.453	0.0201	5.587
158	0.282	0.276	0.0274	2.477
159	0.449	0.430	0.0237	4.176
160	0.340	0.339	0.0330	2.908

Mean	0.370	0.361	0.0259	3.465
SD	0.067	0.063	0.0047	1.008
SEM	0.015	0.014	0.0011	0.225

#### Male Statistics

Mean	0.429	0.416	0.023	4.359
SD	0.030	0.026	0.004	0.559
SEM	0.010	0.008	0.001	0.177

#### Female Statistics

Mean	0.311	0.306	0.029	2.570
SD	0.030	0.030	0.002	0.229
SEM	0.010	0.010	0.001	0.076

## APPENDIX G. ACUTE EXPOSURE STUDY CLINICAL CHEMISTRY AND HEMATOLOGY DATA

### Appendix Abbreviations

K/uL	count * 1000 per microliter
M/uL	count * 1000000 per microliter
ND	not detected
NDR	no data reported
<b>Clinical Chemistry Parameters</b>	
ALB	albumin
ALKP	alkaline phosphatase
ALT	alanine transaminase
AST	aspartate transaminase
BUN	blood urea nitrogen
CHOL	cholesterol
CK	creatine kinase
Cl-	chloride
CREA	creatinine
GLOB	globulins
GLU	glucose
K+	potassium
Na+	sodium
TBIL	total bilirubin
TP	total protein
TRIG	triglycerides
<b>Hematology Parameters</b>	
BA	basophils
EO	eosinophils
HB	hemoglobin
HCT	hematocrit
LY	lymphocytes
MCH	mean corpuscular
MCHC	mean corpuscular hemoglobin concentration
MCV	mean corpuscular volume
MO	monocytes
MPV	mean platelet volume
NE	neutrophils
PLT	platelets
RBC	red blood cells
RDW	red cell distribution width
WBC	white blood cells

## Male and Female Clinical Chemistry Data

Control Exposure Group									
Gender	Animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	5	3.2	210	77	74	18	61	251	0.2
female	6	2.7	169	56	71	15	69	155	0.2
male	7	2.9	186	49	65	14	55	260	0.2
female	8	3.1	100	33	98	19	70	916	0.2
male	13	3.3	192	81	68	21	66	387	0.3
female	14	2.7	132	42	59	16	83	220	0.1
male	15	2.9	189	58	60	17	53	308	0.2
female	16	2.9	167	53	78	16	75	552	0.2
male	21	3.4	192	86	68	16	58	282	0.3
female	22	2.9	176	48	60	14	84	264	0.2
male	23	2.8	185	63	60	18	56	210	0.2
female	24	2.8	148	55	70	18	84	314	0.2
male	29	3.2	228	81	71	21	65	394	0.3
female	30	2.9	124	45	52	16	81	206	0.2
male	31	3.4	211	81	59	19	62	265	0.2
female	32	2.8	145	60	55	18	81	222	0.2
male	37	3.1	197	71	44	16	63	289	0.2
female	38	3.1	102	55	96	19	86	588	0.2
male	39	3.0	204	55	63	15	65	351	0.3
female	40	2.8	105	29	55	14	81	287	0.2

Gender	Animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	5	2.9	175	ND	6.1	126	147	4.3	102
female	6	2.4	134	ND	5.1	23	145	5.1	106
male	7	2.6	154	ND	5.4	62	146	4.3	105
female	8	2.7	127	0.6	5.9	22	144	5.8	105
male	13	2.7	267	ND	6.0	92	145	5.2	101
female	14	2.6	193	ND	5.3	27	146	3.7	105
male	15	2.6	195	ND	5.5	81	145	4.2	103
female	16	2.7	175	ND	5.6	31	145	5.6	104
male	21	2.5	192	ND	5.9	71	146	6.4	103
female	22	2.5	136	ND	5.4	18	146	4.2	105
male	23	2.7	179	ND	5.5	98	146	4.1	103
female	24	2.4	156	ND	5.3	28	146	3.9	105
male	29	2.8	186	ND	6.0	159	146	5.0	101
female	30	2.8	163	ND	5.7	23	145	3.9	105
male	31	2.8	185	ND	6.2	199	145	4.7	102
female	32	2.4	201	ND	5.3	26	146	4.8	105
male	37	2.7	174	ND	5.7	87	146	4.2	103
female	38	2.8	176	0.2	5.9	26	145	4.8	103
male	39	2.7	232	ND	5.8	156	145	5.1	103
female	40	2.7	151	ND	5.5	19	147	4.3	105
ND=Non Detect									

Low Exposure Group									
Gender	Animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	45	3.0	135	58	96	20	50	688	0.1
female	46	2.9	167	55	54	17	86	137	0.2
male	47	3.3	187	70	64	17	56	226	0.2
female	48	2.8	118	58	71	15	74	266	0.2
male	53	2.8	204	74	89	16	65	281	0.2
female	54	3.2	109	80	116	21	79	876	0.1
male	55	2.9	214	78	83	18	51	237	0.3
female	56	2.8	128	81	69	17	76	498	0.2
male	61	3.0	257	57	56	20	71	263	0.2
female	62	3.0	149	48	63	18	83	409	0.2
male	63	2.9	188	70	46	17	59	153	0.2
female	64	2.9	112	48	72	16	73	401	0.2
male	69	2.9	185	49	66	17	65	281	0.2
female	70	3.0	132	52	55	18	80	228	0.2
male	71	3.2	177	54	63	16	54	334	0.2
female	72	2.8	134	71	54	15	79	199	0.2
male	77	2.9	199	52	66	19	56	729	0.2
female	78	2.8	153	54	67	15	83	193	0.2
male	79	2.9	216	67	60	17	57	266	0.2
female	80	3.2	74	52	93	17	88	662	0.1

Gender	Animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	45	2.8	169	0.5	5.8	89	143	5.6	106
female	46	2.7	158	ND	5.5	22	146	4.0	105
male	47	2.6	135	ND	5.9	88	146	5.1	102
female	48	2.6	124	ND	5.4	17	147	4.1	106
male	53	2.6	233	ND	5.4	98	146	4.2	103
female	54	2.7	180	1.0	5.9	45	143	6.2	105
male	55	2.7	169	ND	5.6	65	146	4.2	104
female	56	2.6	162	ND	5.4	21	144	4.5	105
male	61	2.6	219	ND	5.6	165	143	7.1	102
female	62	2.5	131	ND	5.5	17	146	4.3	106
male	63	2.6	189	ND	5.6	102	145	4.2	105
female	64	2.5	126	ND	5.3	22	144	4.6	105
male	69	3.1	178	ND	6.0	116	146	4.3	103
female	70	2.6	209	ND	5.6	30	146	5.5	105
male	71	2.7	179	ND	5.8	70	145	4.5	104
female	72	2.5	155	ND	5.3	27	145	3.9	104
male	77	2.6	205	ND	5.5	116	144	4.6	102
female	78	2.5	177	ND	5.3	27	146	3.8	106
male	79	2.7	191	ND	5.5	170	146	4.0	105
female	80	3.3	165	1.1	6.5	25	144	5.4	107

ND=Non Detect

Intermediate Exposure Group									
Gender	Animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	85	3.0	134	54	83	15	46	456	0.1
female	86	3.0	121	32	68	14	78	295	0.2
male	87	3.3	118	43	116	19	43	976	0.1
female	88	3.0	124	61	62	16	86	229	0.2
male	93	3.0	242	78	71	18	54	296	0.2
female	94	2.9	137	58	59	14	83	227	0.2
male	95	3.0	224	62	55	17	61	188	0.2
female	96	3.0	113	53	60	17	85	370	0.2
male	101	3.1	219	61	55	20	64	296	0.2
female	102	3.2	142	72	77	20	96	279	0.1
male	103	2.8	204	77	62	18	52	319	0.2
female	104	2.8	188	59	84	18	74	1155	0.2
male	109	2.8	194	48	59	16	55	278	0.2
female	110	2.8	136	52	67	16	83	486	0.2
male	111	2.9	155	62	51	15	54	173	0.2
female	112	2.8	139	61	51	18	80	152	0.2
male	117	2.8	207	55	62	14	51	336	0.2
female	118	2.9	129	46	64	19	80	518	0.3
male	119	2.8	195	58	61	18	55	285	0.3
female	120	3.0	127	39	54	16	90	154	0.2

Gender	Animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	85	2.8	141	0.2	5.8	44	144	5.0	105
female	86	2.5	108	ND	5.5	23	146	4.2	106
male	87	3.1	172	1.2	6.3	68	144	5.5	106
female	88	2.6	159	ND	5.6	17	147	5.1	106
male	93	2.5	174	ND	5.5	106	147	3.9	103
female	94	2.6	103	ND	5.4	31	145	5.8	108
male	95	2.8	242	ND	5.8	86	145	5.2	102
female	96	2.5	175	ND	5.5	32	145	4.4	105
male	101	2.6	152	ND	5.7	118	147	4.4	104
female	102	2.7	148	0.1	5.9	26	144	4.2	105
male	103	2.6	171	ND	5.4	98	146	4.0	104
female	104	2.3	203	ND	5.1	28	145	5.3	104
male	109	2.7	188	ND	5.5	94	145	4.1	103
female	110	2.4	186	ND	5.2	26	143	4.2	104
male	111	2.9	211	ND	5.7	61	146	4.0	104
female	112	2.5	165	ND	5.3	28	145	3.7	105
male	117	2.6	219	ND	5.4	67	145	4.1	103
female	118	2.6	158	ND	5.4	28	145	4.7	104
male	119	2.7	149	ND	5.5	76	145	4.5	104
female	120	2.7	188	ND	5.7	24	147	4.7	104

ND=Non Detect

High Exposure Group									
	Animal	ALB	ALKP	ALT	AST	BUN	CHOL	CK	CREA
Gender	ID	(g/dL)	(U/L)	(U/L)	(U/L)	(mg/dL)	(mg/dL)	(U/L)	(mg/dL)
male	125	3.0	232	72	73	18	55	312	0.2
female	126	2.7	147	51	65	15	83	260	0.2
male	127	3.0	162	55	62	16	52	311	0.3
female	128	2.9	121	53	82	18	81	411	0.2
male	133	3.0	234	72	59	21	62	236	0.3
female	134	3.2	126	70	480	19	88	NDR	0.1
male	135	2.9	197	64	55	15	53	204	0.2
female	136	2.9	106	63	85	17	84	472	0.1
male	141	3.0	184	56	51	15	67	227	0.2
female	142	2.8	175	44	60	20	88	245	0.2
male	143	2.9	215	65	63	16	58	349	0.1
female	144	2.6	149	48	56	19	68	186	0.2
male	149	2.8	169	59	64	18	60	352	0.3
female	150	2.8	146	68	61	18	70	286	0.2
male	151	3.0	189	46	55	17	66	202	0.2
female	152	2.9	108	57	72	14	78	431	0.1
male	157	3.2	213	54	53	16	69	297	0.2
female	158	3.0	134	41	62	18	76	314	0.2
male	159	2.7	185	49	56	18	54	257	0.2
female	160	2.9	131	51	63	17	78	365	0.2
						NDR=No Data Reported			

	Animal	GLOB	GLU	TBIL	TP	TRIG	Na+	K+	Cl-
Gender	ID	(g/dL)	(mg/dL)	(mg/dL)	(g/dL)	(mg/dL)	(mmol/L)	(mmol/L)	(mmol/L)
male	125	2.6	174	NDR	5.6	114	144	4.7	102
female	126	2.7	124	NDR	5.4	23	145	4.1	104
male	127	2.7	149	NDR	5.7	45	146	4.7	104
female	128	2.9	127	0.1	5.8	42	143	6.4	106
male	133	2.6	211	NDR	5.6	128	145	5.0	102
female	134	2.8	179	0.4	6.0	30	NDR	NDR	NDR
male	135	2.6	177	NDR	5.4	61	145	4.3	105
female	136	2.7	158	0.3	5.7	31	144	4.9	105
male	141	2.9	151	NDR	5.8	63	145	4.8	104
female	142	2.4	175	NDR	5.2	44	145	4.9	104
male	143	2.6	189	NDR	5.4	116	144	4.1	104
female	144	2.4	156	NDR	5.0	22	146	4.0	106
male	149	2.7	176	NDR	5.5	84	145	4.2	104
female	150	2.5	153	NDR	5.3	32	146	3.8	106
male	151	2.7	217	NDR	5.7	128	145	4.2	103
female	152	2.7	156	0.3	5.5	20	144	4.5	106
male	157	2.7	210	NDR	5.9	155	145	4.1	103
female	158	2.5	159	NDR	5.4	25	147	4.4	107
male	159	2.6	175	NDR	5.3	94	146	4.6	105
female	160	2.5	176	NDR	5.3	28	145	4.3	106
						NDR=No Data Reported			

## Male and Female Hematology Data

Control Exposure Group										
Animal ID	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %	MO% %	EO% %
5	6.84	1.5	5.22	0.09	0.02	0.01	21.97	76.27	1.29	0.32
5	6.46	1.24	5.13	0.08	0.01	0	19.23	79.44	1.19	0.15
6	5.68	1.04	4.57	0.06	0.01	0	18.3	80.44	1.09	0.17
6	5.8	0.98	4.77	0.05	0	0	16.92	82.16	0.84	0
7	5.38	1.82	3.33	0.08	0.06	0.08	33.89	61.98	1.52	1.09
7	6.78	2.16	4.34	0.16	0.07	0.05	31.83	64.08	2.31	1.01
8	3	0.14	2.78	0.08	0	0	4.71	92.62	2.5	0.16
8	3.04	0.09	2.86	0.08	0	0	3.08	94.11	2.66	0.15
13	12.34	2.73	8.96	0.39	0.17	0.1	22.1	72.58	3.19	1.35
13	9.5	2.11	6.82	0.48	0.08	0.02	22.23	71.76	5.03	0.82
14	7.72	1.27	6.33	0.09	0.01	0.02	16.47	82	1.14	0.13
14	8.92	1.58	7.27	0.06	0	0.01	17.72	81.53	0.63	0.05
15	8.26	2.27	5.88	0.11	0	0	27.53	71.15	1.29	0.03
15	8.28	1.98	5.91	0.38	0	0.01	23.9	71.36	4.63	0
16	8.5	1.17	7.14	0.18	0	0	13.82	84.03	2.15	0
16	8.68	1.25	7.28	0.14	0.01	0	14.45	83.82	1.58	0.15
21	7.3	1.54	5.07	0.67	0.01	0.01	21.11	69.52	9.18	0.13
21	7.24	1.58	5.11	0.55	0.01	0.01	21.81	70.53	7.53	0.07
22	7.62	1.07	6.42	0.13	0	0	14	84.3	1.7	0
22	4.86	0.6	4.18	0.09	0	0	12.25	86	1.75	0
22	7.3	0.85	6.4	0.05	0	0.01	11.61	87.62	0.71	0
23	7.02	1.6	5.26	0.11	0.04	0.01	22.8	74.92	1.5	0.56
23	6.94	1.47	5.19	0.17	0.08	0.02	21.18	74.85	2.5	1.11
24	4.64	0.64	3.95	0.05	0	0	13.7	85.19	1.02	0.1
24	4.64	0.77	3.81	0.06	0	0.01	16.54	82.01	1.26	0.08
29	8.12	2.04	5.83	0.25	0	0	25.08	71.8	3.07	0.06
29	7.98	2.16	5.45	0.37	0	0	27.07	68.25	4.63	0.06
30	6.64	1.08	5.41	0.14	0	0	16.31	81.5	2.18	0
30	6.62	1.08	5.48	0.06	0	0	16.34	82.79	0.86	0
31	8.18	2.36	5.62	0.19	0	0	28.88	68.68	2.38	0.06
31	8.28	2.43	5.59	0.26	0	0	29.37	67.48	3.09	0.06
32	5.62	0.76	4.75	0.11	0	0	13.5	84.5	1.99	0
32	5.76	0.94	4.75	0.06	0	0	16.29	82.54	1.1	0.08
37	7.84	1.44	6.31	0.08	0	0	18.38	80.51	1.06	0.05
37	8.22	1.39	6.64	0.19	0	0	16.93	80.74	2.27	0.06
38	4.86	0.67	4.13	0.05	0	0	13.85	85.05	1.1	0
38	4.88	0.63	4.15	0.1	0	0	13	84.98	2.02	0
39	8.08	2.23	5.66	0.18	0	0	27.63	70.11	2.2	0.06
39	7.94	2.17	5.55	0.22	0	0	27.36	69.86	2.78	0
40	6.6	1.21	5.23	0.13	0.01	0.01	18.39	79.29	2.02	0.17
40	6.44	1.17	5.1	0.13	0.02	0.01	18.23	79.21	2.07	0.3
Data not included in statistics due to instrument error										

Animal ID	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
5	0.15	8.86	14.5	40.1	45.3	16.4	36.2	18.1	89	10.4
5	0	8.88	14.3	40.6	45.7	16.1	35.2	17.4	63	8.4
6	0	8.23	13.7	39.3	47.8	16.6	34.9	17.1	47	11
6	0.08	8.41	14.6	40.5	48.2	17.4	36	16.6	63	10.9
7	1.53	6.38	10.2	27.3	42.8	16	37.4	17.1	670	5.7
7	0.76	8.69	15	37.3	42.9	17.3	40.2	17.2	816	6
8	0	8.22	13.5	38.5	46.8	16.4	35.1	16.8	86	13.6
8	0	8.2	13.3	37.4	45.6	16.2	35.6	17	66	12.1
13	0.79	9.25	15.3	43.6	47.1	16.5	35.1	18.6	429	6.4
13	0.17	9.64	15.2	45.4	47.1	15.8	33.5	18.1	552	5.9
14	0.25	7.9	12.6	36.5	46.2	15.9	34.5	17.1	524	5.6
14	0.07	9.33	15.5	44.3	47.5	16.6	35	17.6	544	6.4
15	0	8.98	14.7	38.7	43.1	16.4	38	17.3	797	5.6
15	0.11	9.22	14.7	40.4	43.8	15.9	36.4	17.2	829	5.5
16	0	8.96	15.6	43.3	48.3	17.4	36	15.6	230	8.7
16	0	8.92	15.3	44	49.3	17.2	34.8	15.6	260	7.4
21	0.07	9.45	16	47.9	50.7	16.9	33.4	16.3	734	5.5
21	0.07	9.65	16.1	49.1	50.9	16.7	32.8	17.6	748	5.7
22	0	9.05	15.8	40.7	45	17.5	38.8	16.8	764	5.2
22	0	6.46	10.1	29.5	45.6	15.6	34.2	16	593	5.4
22	0.07	9.3	15.6	41.9	45.1	16.8	37.2	17.2	714	5.1
23	0.21	9.07	15.3	39.7	43.8	16.9	38.5	17.7	543	5.4
23	0.36	8.98	15.1	39.6	44.1	16.8	38.1	17.2	712	5.5
24	0	8.38	14.2	40.1	47.9	16.9	35.4	16.1	794	5.3
24	0.11	8.14	14.5	38.5	47.3	17.8	37.7	15.8	729	5
29	0	9.49	15.4	47.4	49.9	16.2	32.5	17.5	694	5.6
29	0	9.54	16.7	48.2	50.5	17.5	34.6	16.6	723	5.6
30	0	8.18	14.8	39.8	48.7	18.1	37.2	15.1	709	5.7
30	0	8.7	15	42.5	48.8	17.2	35.3	15.6	756	5.5
31	0	9.48	15.1	40	42.2	15.9	37.8	17.8	745	5.4
31	0	9.07	15.6	39.1	43.1	17.2	39.9	18.6	700	5.3
32	0	8.83	14.9	40.6	46	16.9	36.7	16.1	751	5.4
32	0	8.67	14.9	40.5	46.7	17.2	36.8	16.6	691	5.5
37	0	9.1	15.6	43	47.2	17.1	36.3	16.8	681	6.1
37	0	9.17	16.1	43.6	47.6	17.6	36.9	17.6	749	6.1
38	0	8.98	15.5	43.9	48.9	17.3	35.3	16	73	12.6
38	0	8.89	15	43.8	49.3	16.9	34.2	15.4	52	12.9
39	0	9.46	15.5	42.4	44.8	16.4	36.6	17.5	713	6
39	0	9.31	15.2	41.9	45	16.3	36.3	17.9	692	5.7
40	0.14	8.48	14.1	41.4	48.8	16.6	34.1	15.1	710	5.6
40	0.19	8.62	14.1	42.5	49.3	16.4	33.2	15.6	708	5.5
Data not included in statistics due to instrument error										



Low Exposure Group										
Animal ID	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %	MO% %	EO% %
45	3.88	0.69	3.15	0.03	0	0.01	17.87	81.08	0.66	0
45	3.2	0.6	2.59	0.01	0	0	18.81	80.96	0.22	0
46	6.52	1.02	5.35	0.14	0.01	0	15.63	82.1	2.16	0.12
46	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
47	8.36	1.69	6.52	0.14	0.01	0	20.22	78.05	1.64	0.09
47	8	1.65	6.19	0.15	0	0	20.63	77.39	1.92	0.06
48	7.06	1.25	5.59	0.2	0.02	0	17.69	79.2	2.86	0.25
48	7.14	1.27	5.76	0.1	0	0.02	17.74	80.62	1.38	0
53	9.66	1.44	7.36	0.85	0.01	0	14.92	76.18	8.79	0.1
53	9.46	1.38	7.43	0.64	0.01	0	14.6	78.51	6.74	0.14
54	4.2	0.38	3.77	0.04	0	0	9	89.7	1.07	0.11
54	4.26	0.3	3.88	0.07	0	0	7.13	91.16	1.71	0
55	6.66	1.27	5.14	0.23	0.01	0	19.11	77.22	3.47	0.13
55	7	1.47	5.28	0.24	0.01	0	20.93	75.47	3.36	0.18
56	7.32	1.03	6.16	0.1	0.02	0.01	14.12	84.1	1.38	0.33
56	6.56	0.87	5.58	0.09	0.01	0.02	13.22	85.09	1.33	0.12
61	9.02	2.08	6.83	0.08	0.03	0	23.1	75.73	0.84	0.32
61	9.02	2.14	6.79	0.09	0.01	0	23.67	75.27	0.95	0.1
62	6.74	0.97	5.73	0.04	0	0	14.41	84.98	0.62	0
62	6.66	0.91	5.64	0.11	0	0	13.73	84.69	1.58	0
63	9.36	1.95	7.24	0.17	0	0	20.81	77.4	1.79	0
63	9.08	1.85	7.01	0.21	0	0	20.41	77.25	2.35	0
64	3.92	0.23	3.61	0.08	0	0	5.96	92.05	1.98	0
64	4.1	0.22	3.88	0	0	0	5.43	94.55	0.02	0
69	7.2	1.73	5.25	0.08	0.09	0.04	24.06	72.95	1.12	1.24
69	9.18	2.48	6.47	0.13	0.09	0.01	26.97	70.53	1.39	0.95
70	5.92	1	4.85	0.05	0.01	0.01	16.89	81.93	0.78	0.18
70	5.5	0.87	4.57	0.05	0.01	0	15.73	83.09	0.91	0.26
71	6.76	1.48	5.26	0.02	0	0	21.93	77.75	0.32	0
71	6.86	1.63	5.22	0.01	0.01	0	23.71	76.07	0.08	0.14
71	6.56	1.47	5.07	0.01	0.01	0	22.47	77.28	0.08	0.17
72	6.92	1.07	5.77	0.01	0.06	0.01	15.47	83.37	0.08	0.92
72	6.64	1.04	5.49	0.09	0.01	0	15.7	82.66	1.42	0.15
77	7.48	2.3	5.01	0.17	0	0	30.71	66.99	2.26	0.04
77	7.52	2.34	5	0.17	0	0	31.07	66.55	2.25	0.06
78	6.74	1.01	5.61	0.12	0	0	15.01	83.28	1.71	0
78	6.42	1.06	5.26	0.1	0	0	16.51	81.92	1.5	0.07
79	6.6	1.48	4.93	0.18	0.01	0	22.46	74.65	2.68	0.15
79	6.48	1.31	5.01	0.14	0.02	0	20.21	77.39	2.09	0.31
80	2.48	0.27	2.16	0.05	0	0	10.84	87.17	1.89	0.1
80	2.44	0.22	2.19	0.02	0.01	0	8.89	89.81	0.73	0.38
Data not included in statistics due to instrument error										

Animal ID	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
45	0.38	7.27	11.7	32.7	45	16.1	35.8	17.2	71	11.9
45	0	7.42	11.7	32.1	43.2	15.8	36.4	17.2	65	12.7
46	0	8.3	14.4	37.8	45.6	17.3	38.1	16.6	758	5.9
46	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
47	0	9.96	16.4	41	41.2	16.5	40	16.7	738	5.8
47	0	8.99	15.4	38.1	42.4	17.1	40.4	17.4	735	5.7
48	0	9.73	16.3	43.4	44.6	16.8	37.6	18.2	573	6.5
48	0.26	9.41	16.1	42.9	45.6	17.1	37.5	17.5	460	7
53	0	9.28	15.2	43.7	47.1	16.4	34.8	17.6	740	5.6
53	0	9.15	15	44.5	48.6	16.4	33.7	17.3	703	5.3
54	0.11	8.15	13.7	37.4	45.9	16.8	36.6	17.1	29	9.3
54	0	8.11	13.5	37.1	45.8	16.6	36.4	16.9	47	9.4
55	0.07	8.07	12.7	36.4	45.1	15.7	34.9	17.2	440	5.5
55	0.06	8.65	14.9	39.7	45.9	17.2	37.5	18.2	515	6
56	0.07	8.86	15.3	43.1	48.6	17.3	35.5	16.3	337	6.4
56	0.24	8.41	14.5	40.6	48.3	17.2	35.7	15.6	294	5.7
61	0	8.96	15.3	41.8	46.6	17.1	36.6	17.1	610	6
61	0	9.31	15.9	40.5	43.5	17.1	39.3	17.7	541	5.6
62	0	9.56	16	43.2	45.2	16.7	37	17.2	135	7.7
62	0	9.16	15.5	41.4	45.2	16.9	37.4	17.2	140	8
63	0	9.51	15.2	39.9	42	16	38.1	17.8	731	5.4
63	0	9.54	15.4	40.5	42.5	16.1	38	18.2	731	5.3
64	0	8.08	13.7	37.4	46.3	17	36.6	16.6	26	11.4
64	0	8.27	14	38.4	46.4	16.9	36.5	16.6	77	13.6
69	0.62	6.93	11.1	33.5	48.4	16	33.1	17.1	368	6.6
69	0.16	9.4	16.3	46.6	49.6	17.3	35	17.1	396	6.3
70	0.22	9.16	15.4	42.8	46.7	16.8	36	16.6	285	6.4
70	0	8.61	14.9	41.3	48	17.3	36.1	15.7	265	5.8
71	0	9.24	16.1	39	42.2	17.4	41.3	17.8	404	12.4
71	0	9.38	16.9	40.4	43.1	18	41.8	18.1	89	9.8
71	0	9.74	16.5	42.8	43.9	16.9	38.6	17.7	84	10.4
72	0.16	8.28	14.4	38.8	46.9	17.4	37.1	16.1	681	5.4
72	0.07	8.61	14.4	40.7	47.3	16.7	35.4	16.1	643	5.4
77	0	8.86	14.7	41.4	46.7	16.6	35.5	17	674	6
77	0.06	8.69	14.5	40.7	46.8	16.7	35.6	16.6	700	6
78	0	8.45	14.2	40.7	48.2	16.8	34.9	16	715	5.8
78	0	8.16	14.1	40	49	17.3	35.2	15.4	689	5.8
79	0.07	8.62	14.6	38.9	45.1	16.9	37.5	17.7	547	6.2
79	0	8.67	14.5	38.9	44.9	16.7	37.3	17.7	563	6.3
80	0	9.14	14.9	45.1	49.3	16.3	33	15.8	65	10.5
80	0.19	9.17	15.4	45.2	49.3	16.8	34.1	16.6	75	10.3
Data not included in statistics due to instrument error										

Intermediate Exposure Group										
Animal ID	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %	MO% %	EO% %
85	2.94	0.25	2.6	0.09	0	0	8.51	88.35	3.15	0
85	3	0.24	2.68	0.06	0.01	0.01	8.1	89.35	1.9	0.33
86	6.06	0.85	5.06	0.15	0	0	13.97	83.45	2.5	0
86	6.32	0.79	5.2	0.33	0	0	12.56	82.28	5.17	0
87	1.82	0.36	1.44	0.03	0	0	19.51	79.09	1.41	0
87	2.72	0.42	2.27	0.01	0	0	15.61	83.53	0.54	0.17
87	2.92	0.48	2.43	0	0	0	16.33	83.31	0.05	0.16
88	6.44	1.3	4.97	0.17	0	0	20.24	77.16	2.6	0
88	5.24	1.14	4.06	0.04	0	0	21.71	77.56	0.74	0
93	8.38	2.09	5.82	0.46	0.01	0	24.95	69.46	5.53	0.06
93	8.04	2.21	5.62	0.21	0	0	27.49	69.9	2.61	0
94	1.54	0.1	1.43	0.01	0.01	0	6.3	92.62	0.4	0.67
94	2.02	0.13	1.8	0.09	0	0	6.41	89.19	4.39	0
94	1.86	0.09	1.71	0.05	0	0	5.03	91.94	2.79	0.24
95	8.88	1.77	6.88	0.22	0	0	19.98	77.51	2.51	0
95	8.62	1.64	6.76	0.21	0.01	0	19.07	78.42	2.38	0.08
96	5.06	0.69	4.32	0.05	0	0	13.66	85.34	0.92	0.08
96	5.3	0.74	4.51	0.05	0	0	13.98	85.13	0.9	0
101	8.7	1.84	6.77	0.09	0	0	21.13	77.83	0.98	0.05
101	8.56	1.69	6.63	0.23	0.01	0	19.71	77.5	2.68	0.11
102	6.12	0.42	5.67	0.03	0	0	6.88	92.62	0.5	0
102	6.26	0.45	5.73	0.08	0	0	7.26	91.49	1.25	0
103	7.64	1.81	5.65	0.18	0	0	23.64	73.98	2.33	0.05
103	7.54	1.95	5.45	0.13	0.01	0	25.88	72.27	1.67	0.17
104	7.82	1.1	6.52	0.2	0	0	14.12	83.35	2.52	0
104	8.02	1.08	6.9	0.02	0	0	13.51	86.08	0.3	0.06
109	8.94	2.39	6.33	0.22	0	0	26.73	70.79	2.42	0
109	8.82	2.06	6.49	0.27	0	0	23.33	73.54	3.08	0.05
110	7.1	0.8	6.23	0.07	0	0	11.33	87.68	1	0
110	6.82	0.74	5.98	0.1	0	0	10.82	87.72	1.46	0
111	7.06	2.01	4.99	0.06	0	0	28.48	70.64	0.88	0
111	7.42	2.09	5.16	0.16	0.01	0	28.19	69.54	2.21	0.07
112	4.02	0.64	3.35	0.03	0	0	15.93	83.21	0.87	0
112	6.58	0.92	5.64	0.02	0	0	13.92	85.77	0.31	0
112	6.66	1	5.59	0.06	0	0.01	15.02	83.89	0.94	0
117	7.94	2.03	5.64	0.26	0	0	25.55	71.08	3.31	0
117	7.98	2.03	5.84	0.11	0	0	25.45	73.23	1.32	0
118	5.92	1.45	4.39	0.06	0	0.01	24.57	74.2	1.08	0
118	6.08	1.32	4.59	0.16	0	0	21.78	75.51	2.71	0
119	7.72	2.18	5.25	0.15	0.11	0.03	28.27	67.97	1.93	1.43
119	7.08	1.76	5.05	0.23	0.02	0.01	24.84	71.34	3.31	0.34
120	6	0.78	5.17	0.06	0	0	12.92	86.13	0.95	0
120	6.06	0.84	5.17	0.06	0	0	13.8	85.28	0.92	0
Data not included in statistics due to instrument error										

Animal ID	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
85	0	8.53	14	38.7	45.4	16.4	36.2	18.3	104	11.6
85	0.33	8.53	14.8	38.3	44.9	17.4	38.6	18.1	91	13
86	0.08	8.99	16	44.1	49	17.8	36.3	14.9	659	5.7
86	0	9.06	15.9	44	48.6	17.5	36.1	15.6	693	5.7
87	0	4.56	6.4	19.6	42.9	14	32.7	16.4	59	10.3
87	0.17	7.83	12.5	33	42.1	16	37.9	17.4	167	10.5
87	0.16	7.58	11.5	31.8	41.9	15.2	36.2	17.4	73	9.9
88	0	9.59	16.3	43.7	45.6	17	37.3	17.4	805	5.8
88	0	7.86	12.4	35.5	45.2	15.8	34.9	17.2	767	6
93	0	9.41	16.4	43.9	46.6	17.4	37.4	17	832	5.5
93	0	9.48	15.7	44.3	46.7	16.6	35.4	16.8	879	5.6
94	0	7.79	11.6	34.6	44.4	14.9	33.5	16.5	21	10.5
94	0	8.32	13.3	37.6	45.2	16	35.4	16.6	42	11.8
94	0	7.9	13.1	36.1	45.7	16.6	36.3	17.4	68	10.5
95	0	9.33	15.3	42.9	46	16.4	35.7	18.2	740	6.1
95	0.05	9.44	15.1	41.5	44	16	36.4	18	729	5.5
96	0	8.92	13.6	44	49.3	15.2	30.9	15.7	111	7.6
96	0	8.42	14.4	41.8	49.7	17.1	34.4	15.1	70	10.1
101	0	9.23	16	41.5	45	17.3	38.6	17.5	833	5.7
101	0	9.27	16.1	39.7	42.8	17.4	40.6	17.3	804	5.2
102	0	9.34	16.3	41.5	44.4	17.5	39.3	16.6	131	12
102	0	9.56	16.1	43.2	45.2	16.8	37.3	17.2	89	11.7
103	0	9.35	15.7	41.4	44.3	16.8	37.9	18.2	694	5.4
103	0	8.89	15.4	39.6	44.6	17.3	38.9	18.8	659	5.3
104	0	8.6	14.2	40	46.5	16.5	35.5	16.7	761	5.7
104	0.06	8.38	14.3	39.3	46.9	17.1	36.4	16.1	693	5.5
109	0.05	8.87	15.5	43.5	49	17.5	35.6	17.1	690	5.5
109	0	8.86	15.2	42.4	47.9	17.2	35.8	17.6	704	5.8
110	0	9.42	16	44.2	46.9	17	36.2	16.5	693	5.4
110	0	8.22	13.8	38.9	47.3	16.8	35.5	16	594	5.5
111	0	8.91	14.7	38.2	42.9	16.5	38.5	19	674	5.2
111	0	9.13	15	38.3	42	16.4	39.2	18.4	707	5.3
112	0	5.39	8.5	23.1	42.8	15.8	36.8	16	469	5.2
112	0	8.48	15.2	38.8	45.8	17.9	39.2	16.9	730	5.4
112	0.14	9.2	15.1	43.2	47	16.4	35	17.1	718	5.1
117	0.06	8.7	14.8	39.5	45.4	17	37.5	17.5	685	5.9
117	0	8.54	14.4	40.1	47	16.9	35.9	16.6	672	5.3
118	0.16	8.54	14.3	41	48	16.7	34.9	17.1	716	5.7
118	0	8.52	14.2	40	47	16.7	35.5	16.1	749	5.8
119	0.4	8.82	14.7	39.5	44.8	16.7	37.2	17.7	577	5.7
119	0.18	8.5	14.5	38.5	45.3	17.1	37.7	17.8	597	5.7
120	0	8.82	14.5	42	47.6	16.4	34.5	16.8	98	9.6
120	0	8.75	14.5	40.2	46	16.6	36.1	17.1	129	8.4
Data not included in statistics due to instrument error										

High Exposure Group										
Animal ID	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %	MO% %	EO% %
125	8.66	1.77	6.56	0.33	0.01	0	20.4	75.74	3.76	0.1
125	8.56	1.76	6.54	0.24	0.02	0	20.57	76.36	2.86	0.22
126	6.9	1.39	5.37	0.06	0.05	0.02	20.13	77.87	0.93	0.71
126	6.82	1.26	5.2	0.29	0.03	0.04	18.53	76.24	4.25	0.37
127	7.2	1.76	5.27	0.17	0.01	0	24.39	73.23	2.32	0.07
127	6.88	1.55	5.12	0.2	0.01	0	22.56	74.49	2.85	0.1
128	3.44	0.59	2.82	0.03	0	0	17.14	82.11	0.76	0
128	3.54	0.44	3.03	0.08	0	0	12.3	85.56	2.14	0
133	8.94	2.27	6.38	0.29	0	0	25.35	71.38	3.22	0.05
133	8.6	2.27	5.98	0.35	0	0	26.4	69.54	4.06	0
134	3.12	0.28	2.81	0.03	0	0	8.84	90.12	1.05	0
134	3.08	0.26	2.73	0.09	0	0	8.51	88.51	2.88	0.1
135	5.5	1.31	4.07	0.11	0	0	23.73	74.09	2.09	0.09
135	6.4	1.58	4.68	0.14	0	0	24.75	73.06	2.18	0
136	4.92	0.53	4.32	0.07	0	0	10.84	87.72	1.36	0.09
136	3.1	0.27	2.77	0.06	0	0	8.71	89.39	1.89	0
136	4.82	0.4	4.38	0.04	0	0	8.25	90.9	0.76	0.09
141	8.34	1.67	6.57	0.09	0.01	0	20.02	78.82	1.1	0.06
141	8.04	1.6	6.21	0.23	0	0	19.87	77.29	2.85	0
142	6.98	1.18	5.73	0.07	0	0	16.9	82.05	1.05	0
142	6.66	1.08	5.44	0.13	0.01	0	16.18	81.71	1.97	0.14
143	7.66	1.28	6.2	0.17	0	0	16.7	80.97	2.28	0.06
143	7.88	1.51	6.17	0.2	0	0	19.13	78.34	2.48	0.06
144	7.4	1.04	6.16	0.18	0.01	0.01	13.99	83.2	2.43	0.19
144	7.5	0.88	6.47	0.14	0.01	0	11.69	86.25	1.87	0.13
149	6.38	1.42	4.94	0.02	0	0	22.29	77.41	0.3	0
149	6.26	1.24	4.99	0.03	0	0	19.77	79.73	0.51	0
150	6.76	1.09	5.57	0.08	0.01	0.01	16.17	82.4	1.15	0.18
150	6.76	1.32	5.42	0.01	0	0	19.54	80.24	0.16	0.07
151	8.86	1.85	6.83	0.18	0	0	20.88	77.04	2.02	0.05
151	8.78	1.8	6.69	0.29	0	0	20.49	76.17	3.28	0.05
152	3.08	0.21	2.86	0.02	0	0	6.71	92.72	0.57	0
152	3.34	0.27	3.02	0.05	0	0	7.99	90.44	1.57	0
157	8.42	1.58	6.8	0.04	0	0	18.78	80.72	0.5	0
157	8.4	1.47	6.87	0.05	0.01	0	17.55	81.77	0.63	0.06
158	6.92	1.3	5.53	0.08	0	0.01	18.8	79.89	1.1	0.07
158	6.84	1.29	5.52	0	0.02	0	18.91	80.71	0.03	0.35
159	8.66	2.38	6.1	0.15	0.03	0	27.45	70.48	1.72	0.36
159	9	2.51	6.39	0.08	0.01	0	27.89	71.04	0.91	0.16
160	5.78	1.02	4.67	0.08	0.01	0	17.62	80.77	1.45	0.17
160	5.66	0.93	4.64	0.07	0.01	0	16.41	82.02	1.31	0.25
Data not included in statistics due to instrument error										

Animal ID	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
125	0	8.44	15.5	38.3	45.4	18.4	40.5	17.2	737	6.1
125	0	8.64	14.4	39.9	46.2	16.7	36.1	17.6	736	5.9
126	0.36	8.72	14	41	47	16.1	34.1	16.5	594	6.1
126	0.61	8.62	14.7	40.5	47	17.1	36.3	16.8	613	5.8
127	0	9.21	14.9	38.9	42.2	16.2	38.3	17.8	827	5.9
127	0	8.55	14	36.4	42.6	16.4	38.5	18.1	705	5.7
128	0	7.92	12.4	35.3	44.6	15.7	35.1	17.3	83	11.5
128	0	7.79	12.2	34	43.7	15.7	35.9	17.2	99	12.6
133	0	9.01	15.8	42.9	47.6	17.5	36.8	17.6	781	5.8
133	0	8.78	15.3	40.2	45.8	17.4	38.1	17.4	737	5.7
134	0	8.66	14.5	40	46.2	16.7	36.2	16.9	62	11.3
134	0	8.65	14	39	45.1	16.2	35.9	16.6	31	9.5
135	0	7.8	12.5	35.4	45.4	16	35.3	17.4	736	5.8
135	0	9.01	15.5	40.6	45.1	17.2	38.2	17.2	739	6
136	0	8.83	15.5	44.1	49.9	17.6	35.1	15.1	38	12.8
136	0	5.34	9	25.7	48.2	16.9	35	15.4	21	13.7
136	0	8.51	14.8	41	48.2	17.4	36.1	16.1	66	9.9
141	0	9.51	15.9	41.3	43.4	16.7	38.5	17.7	801	5.8
141	0	9.47	15.3	41	43.3	16.2	37.3	18.9	825	5.7
142	0	8.59	14.9	38.3	44.6	17.3	38.9	16.4	691	5.4
142	0	8.89	15	41	46.1	16.9	36.6	15.8	695	5.4
143	0	9.17	14.9	40.6	44.3	16.2	36.7	18	689	5.3
143	0	8.9	15.2	39	43.8	17.1	39	17.2	703	5.2
144	0.18	9.22	15	42.1	45.7	16.3	35.6	16.6	334	6.4
144	0.06	9.09	14.8	40.4	44.4	16.3	36.6	16.6	319	5.9
149	0	9.11	15.5	42.5	46.6	17	36.5	17.1	67	11.9
149	0	9.2	15.1	43.2	47	16.4	35	16.6	59	11.9
150	0.1	8.54	14.7	39.5	46.2	17.2	37.2	16.6	673	5.8
150	0	8.87	14.7	41.4	46.7	16.6	35.5	16.1	635	5.4
151	0	9.47	15.4	38.4	40.6	16.3	40.1	18.5	743	5.6
151	0	9.36	15.4	39.6	42.3	16.5	38.9	17.8	728	5.7
152	0	8.04	12.8	37.3	46.4	15.9	34.3	16.1	22	11.7
152	0	8.59	14.4	38.8	45.2	16.8	37.1	16.2	126	13.4
157	0	9.43	15.6	41.9	44.4	16.5	37.2	18.2	646	5.7
157	0	9.6	15.7	43	44.8	16.4	36.5	18.5	713	5.9
158	0.13	9.01	15.2	42.8	47.5	16.9	35.5	16.3	331	6.8
158	0	8.93	15	43.1	48.3	16.8	34.8	15.6	412	6.3
159	0	8.8	14.3	40.8	46.4	16.2	35	17.6	649	5.6
159	0	8.82	14.9	40	45.3	16.9	37.2	16.6	638	5.8
160	0	8.55	14.4	41.9	49	16.8	34.4	15.8	657	5.9
160	0	8.49	14.6	43	50.7	17.2	34	15.7	706	6
Data not included in statistics due to instrument error										

## APPENDIX H. ACUTE EXPOSURE STUDY HISTOPATHOLOGY GRADES

### Appendix Key

<b>Severity Ratings</b>	
0	Normal Tissue
1	Minimal/Rare
2	Mild
3	Moderate
4	Marked
5	Severe
<b>Description Key</b>	
BT	basophilic tubules
D	diffuse
DG	degeneration
ED	edema
ENT	essentially normal tissue
F	focal
FE	focal, extensive
G	granulomatous
HM	hemorrhage
IM	inflammation (mononuclear)
IN	inflammation (neutrophilic)
IX	inflammation (mixed)
MF	multifocal
MFE	multifocal, extensive
N	necrosis
ND	necrotic debris
Neph	nephropathy (non-specific)
NP	not processed
O	ossification
RG	regeneration
TD	tubular degeneration (nephropathy)
<b>Abbreviations</b>	
SD	standard deviation
SEM	standard error of the mean

Control, Acute Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150255	1	0		0		0		0		0	
150256	2	0		0		0		0		0	
150257	3	0		0		0		0		0	
150258	4	0		0		0		0		0	
150263	9	0		0		0		0		0	
150264	10	0		0		0		0		0	
150265	11	0		0		0		0		0	
150266	12	0		0		0		0		0	
150271	17	0		0		0		0		0	
150272	18	0		0		0		0		0	
150273	19	0		0		0		0		0	
150274	20	0		0		0		0		0	
150279	25	0		0		0		0		0	
150280	26	0		0		0		0		0	
150281	27	0		0		0		0		0	
150282	28	0		0		0		0		0	
150287	33	0		0		0		0		0	
150288	34	0		0		0		0		0	
150289	35	0		0		0		0		0	
150290	36	0		0		0		0		0	
Mean		0		0		0		0		0	

Fore & Mid-Brain,										Adrenal Glands,
Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues	
1	NP	ENT	ENT	ENT	ENT	IM/F/R	ENT	ENT	cerebellum, thyroid	
2	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
3	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
4	NP	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
9	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
10	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	cerebellum	
11	ENT	ENT	ENT	ENT	ENT	IM/MF/R	ENT	ENT	thyroid	
12	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
17	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
18	NP	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
19	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
20	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	cerebellum, thyroid	
25	NP	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
26	NP	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
27	NP	ENT	ENT	ENT	ENT	ENT	BT/TD/MF/R	ENT	thyroid	
28	NP	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
33	ENT	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
34	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
35	ENT	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
36	ENT	NP	ENT	ENT	ENT	ENT	Neph/MF/R	ENT	thyroid	



Control, Recovery Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150259	5	0		0		0		0		0	
150260	6	0		0		0		0		0	
150261	7	0		0		0		0		0	
150262	8	0		0		0		0		0	
150267	13	0		0		0		0		0	
150268	14	0		0		0		0		0	
150269	15	0		0		0		0		0	
150270	16	0		0		0		0		0	
150275	21	0		0		0		0		0	
150276	22	0		0		0		0		0	
150277	23	0		0		0		0		0	
150278	24	0		0		0		0		0	
150283	29	0		0		0		0		0	
150284	30	0		0		0		0		0	
150285	31	0		0		0		0		0	
150286	32	0		0		0		0		0	
150291	37	0		0		0		0		0	
150292	38	0		0		0		0		0	
150293	39	0		0		0		0		0	
150294	40	0		0		0		0		0	
Mean		0		0		0		0		0	

Fore & Mid-Brain,										Adrenal Glands,
Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues	
5	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
6	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
7	ENT	ENT	ENT	IX/F/R	ENT	ENT	BT/MF/R	ENT	thyroid	
8	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
13	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
14	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
15	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
16	ENT	NP	ENT	ENT	ENT	IM/MF/R	ENT	ENT	thyroid	
21	ENT	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	-	
22	ENT	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	-	
23	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
24	ENT	ENT	ENT	ENT	ENT	IM/MF/R	ENT	ENT	-	
29	ENT	NP	ENT	IM/N/F/R	ENT	ENT	BT/MF/R	ENT	thyroid	
30	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
31	NP	NP	ENT	IM/F/R	ENT	ENT	BT/MF/R	ENT	thyroid	
32	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
37	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
38	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
39	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
40	ENT	NP	ENT	ENT	ENT	ENT	IM/F/R	ENT	thyroid	

100 mg/m3, Acute Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150295	41	0	ENT	0		0		0		2	DG/MF
150296	42	1*	HM/MF	0		0		0		0	ENT
150297	43	1	IM/F	0		0		0		2	DG/N/MF
150298	44	0	ENT	0		0		0		2	DG/N/MF
150303	49	0	ENT	0		0		0		2	DG/N/MFE
150304	50	0	ENT	0		0		0		2	DG/N/MFE
150305	51	0	ENT	0		0		0		0	ENT
150306	52	0	ENT	0		0		0		0	ENT
150311	57	0	ENT	0		0		0		2	DG/N/MF
150312	58	0	ENT	0		0		0		2	DG/N/MF
150313	59	0	ENT	0		0		0		0	ENT
150314	60	0	ENT	0		0		0		0	ENT
150319	65	0	ENT	0		0		0		0	ENT
150320	66	0	ENT	0		0		0		1	DG/N/MF
150321	67	0	ENT	0		0		0		0	ENT
150322	68	1	IM/MF	0		0		0		0	ENT
150327	73	0	ENT	0		0		0		2	DG/N/MF
150328	74	1*	HM/MF	0		0		0		1	DG/N/MF
150329	75	0	ENT	0		0		0		0	ENT
150330	76	0	ENT	0		0		0		0	ENT
Mean		0.11		0		0		0		0.90	
SD		0.32								0.97	
SEM		0.08								0.22	
Lesions		2								10	
N		20								20	
Incidence, %		10								50	
*Multifocal hemorrhage due to euthanasia and not test compound administration; Severity score not included in mean as occurrence is unrelated to compound											

Fore & Mid-Brain,											Adrenal Glands,
Accession #	Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues	
150295	41	ENT	NP	ENT	ENT	ENT	IM/MF/R	ENT	ENT	thyroid	
150296	42	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150297	43	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150298	44	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150303	49	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150304	50	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid, adrenal gland	
150305	51	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	adrenal gland	
150306	52	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid, adrenal gland	
150311	57	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	adrenal gland	
150312	58	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150313	59	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150314	60	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150319	65	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150320	66	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150321	67	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150322	68	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	adrenal gland	
150327	73	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150328	74	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150329	75	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150330	76	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	

100 mg/m3, Recovery Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150299	45	0		0		0		0		0	
150300	46	0		0		0		0		0	
150301	47	0		0		0		0		0	
150302	48	0		0		0		0		0	
150307	53	0		0		0		0		0	
150308	54	0		0		0		0		0	
150309	55	0		0		0		0		0	
150310	56	0		0		0		0		1	DG/MF
150315	61	0		0		0		0		0	
150316	62	0		0		0		0		0	
150317	63	0		0		0		0		0	
150318	64	0		0		0		0		0	
150323	69	0		0		0		0		0	
150324	70	0		0		0		0		0	
150325	71	0		0		0		0		0	
150326	72	0		0		0		0		0	
150331	77	0		0		0		0		0	
150332	78	0		0		0		0		0	
150333	79	1	O/F*	0		0		0		0	
150334	80	0		0		0		0		0	
Mean		0.05		0		0		0		0.05	
SD		0.22								0.22	
SEM		0.05								0.05	
Lesions		1								1	
N		20								20	
Incidence, %		5								5	
* Pulmonary osseus metaplasia (background tension)											

Fore & Mid-Brain,										
Adrenal Glands,										
Accession #	Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues
150299	45	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150300	46	ENT	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	-
150301	47	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150302	48	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150307	53	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150308	54	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150309	55	ENT	ENT	ENT	IM/F/R	ENT	ENT	ENT	ENT	thyroid, adrenal gland
150310	56	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150315	61	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150316	62	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150317	63	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150318	64	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150323	69	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150324	70	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150325	71	ENT	ENT	ENT	ENT	ENT	ENT	IM/F/R	ENT	thyroid
150326	72	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	cerebellum, thyroid
150331	77	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150332	78	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid, adrenal gland
150333	79	ENT	NP	ENT	N/IM/F/R	ENT	ENT	ENT	ENT	thyroid
150334	80	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid

500 mg/m3, Acute Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150335	81	1	IN/MF	0		0		2	N/DG/MF	3	N/DG/MF
150336	82	2	IN/MF	0		0		0	ENT	3	N/DG/MF
150337	83	1*	HM/MFE	0		0		0	ENT	3	N/DG/MF
150338	84	1	IN/MF	0		0		2	N/DG/MF	3	N/DG/MF
150343	89	1	IN/MF	0		0		1	N/DG/MF	3	N/DG/MFE
150344	90	2	IN/MF	0		0		1	N/DG/MF	3	N/DG/MFE
150345	91	1	IM/MF	0		0		1	N/DG/MF	2	N/DG/MFE
150346	92	2	IN/MF	0		0		1	N/DG/MF	3	N/DG/MFE
150351	97	0	ENT	0		0		1	N/DG/MF	3	N/DG/ED/MFE
150352	98	1	IN/MF	0		0		2	N/DG/MF	4	N/DG/ED/MFE
150353	99	1	IM/MF	0		0		2	N/DG/MF	4	N/DG/ED/MFE
150354	100	2	IM/MF	0		0		1	N/DG/MF	4	N/DG/ED/MFE
150359	105	2	IM/MF	0		0		1	N/DG/MF	3	N/DG/ED/MFE
150360	106	1	IN/MF	0		0		1	N/DG/MF	4	N/DG/ED/MFE
150361	107	1	IN/MF	0		0		0	ENT	3	N/DG/ED/MFE
150362	108	1	IM/MF	0		0		1	N/DG/MF	3	N/DG/ED/MFE
150367	113	1	IM/MF	0		0		1	N/DG/MF	3	N/DG/ED/MFE
150368	114	1	IN/IM/MF	0		0		0	ENT	2	N/DG/ED/MFE
150369	115	1	IN/MF	0		0		2	N/DG/MF	4	N/DG/ED/MFE
150370	116	1	IN/MF	0		0		2	N/DG/MF	4	N/DG/ED/MFE
Mean		1.21		0		0		1.10		3.20	
SD		0.54						0.72		0.62	
SEM		0.12						0.16		0.14	
Lesions		18						16		20	
N		20						20		20	
Incidence, %		90						80		100	
*Multifocal extensive hemorrhage due to euthanasia and not test compound administration; Severity score not included in mean as occurrence is unrelated to compound											

Fore & Mid-Brain,											
Adrenal Glands,											
Accession #	Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues	
150335	81	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150336	82	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150337	83	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid, spleen	
150338	84	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150343	89	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150344	90	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150345	91	ENT	ENT	ENT	ENT	ENT	ENT	BT/F/R	ENT	thyroid	
150346	92	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150351	97	NP	ENT	ENT	ENT	ENT	ENT	IM/F/R	ENT	-	
150352	98	ENT	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
150353	99	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	-	
150354	100	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	-	
150359	105	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150360	106	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150361	107	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150362	108	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150367	113	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150368	114	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150369	115	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150370	116	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	

500 mg/m3, Recovery Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150339	85	0	ENT	0		0		1	N/DG/MF	2	IN/DG/ND/MF
150340	86	0	ENT	0		0		0	ENT	1	IN/MF
150341	87	1	IN/MF	0		0		0	ENT	1	IN/MF
150342	88	1	IN/MF	0		0		0	ENT	-	NP
150347	93	0	ENT	0		0		0	ENT	0	ENT
150348	94	0	ENT	0		0		0	ENT	1	IN/MF
150349	95	0	ENT	0		0		0	ENT	0	ENT
150350	96	1	IN/MF	0		0		0	ENT	1	IN/MF
150355	101	0	ENT	0		0		0	ENT	0	ENT
150356	102	0	ENT	0		0		0	ENT	0	ENT
150357	103	0	ENT	0		0		0	ENT	2	DG/MF
150358	104	0	ENT	0		0		0	ENT	0	ENT
150363	109	0	ENT	0		0		0	ENT	1	IN/MF
150364	110	0	ENT	0		0		0	ENT	1	DG/MF
150365	111	0	ENT	0		0		0	ENT	2	DG/RG/IN/MF
150366	112	0	ENT	0		0		0	ENT	0	ENT
150371	117	0	ENT	0		0		0	ENT	3	N/DG/ED/IN/MFE
150372	118	0	ENT	0		0		0	ENT	0	ENT
150373	119	1	IN/MF	0		0		0	ENT	0	ENT
150374	120	0	ENT	0		0		0	ENT	3	N/DG/ED/IN/MFE
Mean		0.20		0		0		0.05		0.95	
SD		0.41						0.22		1.03	
SEM		0.09						0.05		0.24	
Lesions		4						1		11	
N		20						20		19	
Incidence, %		20						5		58	

Fore & Mid-Brain,											
Adrenal Glands,											
Accession #	Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues	
150339	85	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150340	86	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150341	87	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150342	88	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150347	93	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150348	94	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150349	95	NP	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	-	
150350	96	NP	ENT	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
150355	101	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150356	102	NP	NP	ENT	ENT	ENT	ENT	IM/BT/MF/R	ENT	-	
150357	103	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-	
150358	104	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150363	109	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150364	110	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150365	111	NP	NP	ENT	ENT	ENT	ENT	BT/MF/R	ENT	thyroid	
150366	112	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150371	117	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150372	118	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150373	119	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	
150374	120	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid	

1000 mg/m3, Acute Cohort										
Animal										
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4
150375	121	0	ENT	0		0		1	N/IN/MF	3
150376	122	1	IN/MF	0		0		1	N/IN/MF	3
150377	123	1	IN/MF	0		0		1	N/IN/MF	3
150378	124	1*	IN/MF	0		0		1	N/IN/MF	2
150383	129	2	IN/MF	0		0		0	ENT	3
150384	130	2	IN/MF	0		0		0	ENT	4
150385	131	2	IN/MF	0		0		1	N/IN/F	3
150386	132	2	IX/MF	0		0		1	N/MF	3
150391	137	1	IN/MF	0		0		1	N/MF	3
150392	138	1	IN/MF	0		0		2	N/MF	3
150393	139	3	IN/N/ED/FE	0		0		1	N/MF	3
150394	140	2	IN/MF	0		0		2	N/MF	3
150399	145	2	IN/MF	0		0		1	N/MF	4
150400	146	1	IN/MF	0		0		1	N/MF	4
150401	147	1	IN/MF	0		0		1	N/MF	3
150402	148	2	IN/MF	0		0		1	N/MF	3
150407	153	1	IN/MF	0		0		1	N/MF	3
150408	154	2	IN/MF	0		0		1	N/MF	3
150409	155	1	IN/MF	0		0		1	N/MF	3
150410	156	1	IN/MF	0		0		1	N/MF	3
Mean		1.47		0		0		1		3.1
SD		0.70						0.46		0.45
SEM		0.16						0.10		0.10
Lesions		18						18		20
N		20						20		20
Incidence, %		90						90		100

\* Pulmonary inflammation is background lesion

Fore & Mid-Brain,										
Adrenal Glands,										
Accession #	Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues
150375	121	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150376	122	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150377	123	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150378	124	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150383	129	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150384	130	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150385	131	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150386	132	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150391	137	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150392	138	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	adrenal gland
150393	139	ENT	ENT	ENT	ENT	ENT	IM/MF/R	ENT	ENT	-
150394	140	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150399	145	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150400	146	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150401	147	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150402	148	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150407	153	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150408	154	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150409	155	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150410	156	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-

1000 mg/m3, Recovery Cohort											
Animal											
Accession #	ID	Lungs	Description	NL1	Description	NL2	Description	NL3	Description	NL4	Description
150379	125	1	G/MF	0		0		0		1	N/DG/MF
150380	126	1	G/MF	0		0		0		0	ENT
150381	127	0	ENT	0		0		0		0	ENT
150382	128	1	G/F	0		0		0		0	ENT
150387	133	0	ENT	0		0		0		2	ND/IN/RG/F
150388	134	0	ENT	0		0		0		0	ENT
150389	135	2	G/F	0		0		0		2	ND/DG/MF
150390	136	0	ENT	0		0		0		0	ENT
150395	141	1	IN/MF	0		0		0		2	ND/RG/MF
150396	142	1	IN/MF	0		0		0		2	ND/RG/MF
150397	143	1	IN/MF	0		0		0		0	ENT
150398	144	1	IN/MF	0		0		0		0	ENT
150403	149	0	ENT	0		0		0		0	ENT
150404	150	0	ENT	0		0		0		0	ENT
150405	151	0	ENT	0		0		0		1	RG/MF
150406	152	0	ENT	0		0		0		0	ENT
150411	157	0	ENT	0		0		0		0	ENT
150412	158	0	ENT	0		0		0		0	ENT
150413	159	0	ENT	0		0		0		0	ENT
150414	160	0	ENT	0		0		0		0	ENT
Mean		0.45		0		0		0		0.5	
SD		0.60								0.83	
SEM		0.14								0.18	
Lesions		8								6	
N		20								20	
Incidence, %		40								30	

Fore & Mid-Brain,										
Adrenal Glands,										
Accession #	Animal ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid	Missing Tissues
150379	125	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150380	126	NP	ENT	ENT	ENT	ENT	IM/MF/R	ENT	ENT	-
150381	127	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150382	128	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150387	133	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150388	134	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150389	135	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150390	136	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150395	141	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150396	142	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150397	143	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150398	144	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150403	149	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150404	150	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150405	151	ENT	ENT	ENT	IM/N/F/R	ENT	ENT	ENT	ENT	thyroid
150406	152	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150411	157	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
150412	158	NP	NP	ENT	ENT	ENT	IM/MF/R	ENT	ENT	-
150413	159	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
150414	160	ENT	ENT	ENT	ENT	ENT	IM/MF/R	ENT	ENT	-

## APPENDIX I. REPEATED STUDY INHALATION EXPOSURE DATA

### Chamber Uniformity Measurements

Low Exposure Chamber  Sample Location	Total Port Concentration (TP) (mg/m <sup>3</sup> )	Temporal or Within Port Concentration (WP) (mg/m <sup>3</sup> )
Center		23.0
Back Bottom Left	20.2	
Front Bottom Left	19.6	
Back Bottom Right	20.1	
Center		22.3
Front Bottom Right	21.6	
Back Top Left	23.4	
Front Top Left	25.7	
Center		24.3
Back Top Right	25.0	
Front Top Right	25.6	
Center		24.6
(Mean of WP)	23.5	
Mean	22.7	23.5
Std. Dev.	2.4	1.1
N	9	4
Coefficient of variation (CV) for : Total Port Concentration (TPCV) = 10.7% Within Port Concentration (WPCV) = 4.5% Between Port Concentration (BPCV) = 9.7% Where: TPCV = [Std. Dev. (TP) / Mean (TP)] * 100 WPCV = [Std. Dev. (WP) / Mean (WP)] * 100 BPCV = Square Root [(TPCV) <sup>2</sup> - (WPCV) <sup>2</sup> ]		



<b>Intermediate Exposure Chamber</b>	<b>Total Port Concentration (TP) (mg/m<sup>3</sup>)</b>	<b>Temporal or Within Port Concentration (WP) (mg/m<sup>3</sup>)</b>
Center		103
Front Top Left	116	
Back Top Left	111	
Front Top Right	99	
Center		101
Back Top Right	114	
Front Bottom Left	115	
Back Bottom Left	114	
Center		99
Front Bottom Right	106	
Back Bottom Right	102	
Center		91
(Mean of WP)	99	
Mean	108	99
Std. Dev.	7	5
N	9	4
Coefficient of variation (CV) for : Total Port Concentration (TPCV) = 6.7% Within Port Concentration (WPCV) = 5.3% Between Port Concentration (BPCV) = 3.8% Where: TPCV = [Std. Dev. (TP) / Mean (TP)] * 100 WPCV = [Std. Dev. (WP) / Mean (WP)] * 100 BPCV = Square Root [(TPCV) <sup>2</sup> - (WPCV) <sup>2</sup> ]		

<b>High Exposure Chamber</b>	<b>Total Port Concentration (TP) (mg/m<sup>3</sup>)</b>	<b>Temporal or Within Port Concentration (WP) (mg/m<sup>3</sup>)</b>
Center		337
Front Top Left	337	
Back Top Left	337	
Front Top Right	337	
Center		336
Back Top Right	333	
Front Bottom Left	310	
Back Bottom Left	326	
Center		334
Front Bottom Right	275	
Back Bottom Right	304	
Center		333
(Mean of WP)	335	
Mean	322	335
Std. Dev.	21	2
N	9	4
Coefficient of variation (CV) for :		
Total Port Concentration (TPCV) =		6.7%
Within Port Concentration (WPCV) =		0.5%
Between Port Concentration (BPCV) =		6.7%
Where: TPCV = [Std. Dev. (TP) / Mean (TP)] * 100		
WPCV = [Std. Dev. (WP) / Mean (WP)] * 100		
BPCV = Square Root [(TPCV) <sup>2</sup> - (WPCV) <sup>2</sup> ]		

### Average Daily Gravimetric Filter Concentration

Target (mg/m <sup>3</sup> )	Male Rat Exposures			
	0	20	100	300
Date	Average Concentration (mg/m <sup>3</sup> )			
1-May-16	0.000	16.7	107.1	311.8
2-May-16	DNR	22.0	98.3	324.0
3-May-16	DNR	20.2	108.0	293.6
4-May-16	DNR	20.1	96.1	302.6
5-May-16	DNR	20.4	102.5	330.6
8-May-16	DNR	20.8	99.9	286.7
9-May-16	DNR	20.6	104.4	281.0
10-May-16	DNR	20.4	101.2	302.7
11-May-16	DNR	20.5	93.4	274.3
12-May-16	DNR	21.1	110.0	318.6
<b>Average</b>	<b>0.0</b>	<b>20.3</b>	<b>102.1</b>	<b>302.6</b>
St Dev		1.4	5.4	18.8
Minimum	0.0	16.7	93.4	274.3
Maximum	0.0	22.0	110.0	330.6
N	1	10	10	10

DNR=data not recorded

Target (mg/m <sup>3</sup> )	Female Rat Exposures			
	0	20	100	300
Date	Average Concentration (mg/m <sup>3</sup> )			
8-May-16	DNR	20.82	99.89	286.74
9-May-16	DNR	20.64	104.4	281.01
10-May-16	DNR	20.38	101.17	302.7
11-May-16	DNR	20.46	93.39	274.29
12-May-16	DNR	21.11	109.96	318.55
15-May-16	DNR	20.59	97.9	306.6
16-May-16	DNR	19.61	98.01	283.1
17-May-16	DNR	18.64	95.8	300.1
18-May-16	DNR	19.61	92.82	273.8
19-May-16	DNR	21.48	102.82	307.7
<b>Average</b>		<b>20.3</b>	<b>99.6</b>	<b>293.5</b>
St Dev		0.8	5.2	15.6
Minimum		18.6	92.8	273.8
Maximum		21.5	110.0	318.6
N	0	10	10	10

DNR=data not recorded

## Average Daily Cascade Impactor Particle Size Distribution

Male Rat Exposures						
Target (mg/m <sup>3</sup> )	20		100		300	
Date	Low Chamber (100 mg/m <sup>3</sup> )		Intermediate Chamber (500 mg/m <sup>3</sup> )		High Chamber (1000 mg/m <sup>3</sup> )	
	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD
1-May-16	DNR		DNR		2.07	1.79
2-May-16	DNR		2.29	1.93	DNR	
3-May-16	2.01	1.68	DNR		DNR	
4-May-16	DNR		DNR		2.03	1.79
5-May-16	DNR		2.20	2.05	DNR	
8-May-16	1.86	1.69	DNR		DNR	
9-May-16	DNR		DNR		2.36	1.86
10-May-16	DNR		2.41	1.88	DNR	
11-May-16	1.86	1.94	DNR		DNR	
12-May-16	DNR		DNR		2.32	1.88
Average	<b>1.91</b>	<b>1.77</b>	<b>2.30</b>	<b>1.95</b>	<b>2.19</b>	<b>1.83</b>
Standard Deviation	0.09	0.15	0.11	0.09	0.17	0.05
Minimum	1.86	1.68	2.20	1.88	2.03	1.79
Maximum	2.01	1.94	2.41	2.05	2.36	1.88
N	3	3	3	3	4	4

GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter

Female Rat Exposures						
Target (mg/m <sup>3</sup> )	20		100		300	
Date	Low Chamber (100 mg/m <sup>3</sup> )		Intermediate Chamber (500 mg/m <sup>3</sup> )		High Chamber (1000 mg/m <sup>3</sup> )	
	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD
8-May-16	1.86	1.69	DNR		DNR	
9-May-16	DNR		DNR		2.36	1.86
10-May-16	DNR		2.41	1.88	DNR	
11-May-16	1.86	1.94	DNR		DNR	
12-May-16	DNR		DNR		2.32	1.88
15-May-16	DNR		2.42	1.72	DNR	
16-May-16	1.90	1.86	DNR		DNR	
17-May-16	DNR		DNR		2.43	1.93
18-May-16	DNR		2.50	1.91	DNR	
19-May-16	2.01	2.01	DNR		DNR	
Average	<b>1.91</b>	<b>1.88</b>	<b>2.44</b>	<b>1.84</b>	<b>2.37</b>	<b>1.89</b>
Standard Deviation	0.07	0.14	0.05	0.10	0.06	0.04
Minimum	1.86	1.69	2.41	1.72	2.32	1.86
Maximum	2.01	2.01	2.50	1.91	2.43	1.93
N	4	4	3	3	3	3

GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter

## Average Daily Optical Particle Sizer Distribution

Male Rat Exposures								
Target (mg/m <sup>3</sup> )	0		20		100		300	
Date	Control Chamber (0 mg/m <sup>3</sup> )		Low Chamber (100 mg/m <sup>3</sup> )		Intermediate Chamber (500 mg/m <sup>3</sup> )		High Chamber (1000 mg/m <sup>3</sup> )	
	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD
1-May-16	3.24	2.35	1.55	1.71	3.13	1.36	1.94	1.39
2-May-16	1.89	1.98	1.58	1.46	2.64	1.45	1.76	1.45
3-May-16	1.12	1.94	1.86	1.39	5.00	2.01	2.31	1.00
4-May-16	1.54	2.22	1.69	1.38	1.47	1.93	1.48	1.35
5-May-16	4.61	1.62	1.90	1.41	5.43	2.16	ND	ND
8-May-16	0.5	1.32	1.32	1.61	1.60	1.47	1.65	1.41
9-May-16	0.34	1.20	1.44	1.56	1.59	1.48	1.64	1.42
10-May-16	0.94	1.81	1.40	1.57	1.53	1.50	1.62	1.40
11-May-16	3.43	2.46	1.69	1.49	1.67	1.46	1.74	1.37
12-May-16	3.05	2.02	1.81	1.55	1.59	1.48	1.28	1.52
Average	<b>2.07</b>	<b>1.89</b>	<b>1.62</b>	<b>1.51</b>	<b>2.57</b>	<b>1.63</b>	<b>1.71</b>	<b>1.37</b>
SD	1.44	0.42	0.20	0.11	1.50	0.29	0.29	0.15
Minimum	0.34	1.20	1.32	1.38	1.47	1.36	1.28	1.00
Maximum	4.61	2.46	1.90	1.71	5.43	2.16	2.31	1.52
N	10	10	10	10	10	10	9	9

GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter; NDR: no data recorded, coincidence error probably due to high concentrations; SD: standard deviation

Female Rat Exposures								
Target (mg/m <sup>3</sup> )	0		20		100		300	
Date	Control Chamber (0 mg/m <sup>3</sup> )		Low Chamber (100 mg/m <sup>3</sup> )		Intermediate Chamber (500 mg/m <sup>3</sup> )		High Chamber (1000 mg/m <sup>3</sup> )	
	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD	MMAD (µm)	GSD
8-May-16	0.5	1.32	1.32	1.61	1.60	1.47	1.65	1.41
9-May-16	0.34	1.2	1.44	1.56	1.59	1.48	1.64	1.42
10-May-16	0.94	1.81	1.40	1.57	1.53	1.50	1.62	1.40
11-May-16	3.43	2.46	1.69	1.49	1.67	1.46	1.74	1.37
12-May-16	3.05	2.02	1.81	1.55	1.59	1.48	1.28	1.52
15-May-16	4.31	3.70	2.63	2.07	1.64	1.46	0.93	1.55
16-May-16	1.93	2.98	1.78	1.52	1.09	1.55	0.93	1.56
17-May-16	0.36	2.52	1.87	1.47	1.14	1.59	1.20	1.54
18-May-16	4.90	1.64	1.73	1.54	0.92	1.58	0.87	1.55
19-May-16	2.07	2.59	1.75	1.55	1.15	1.59	1.58	1.42
Average	<b>2.18</b>	<b>2.22</b>	<b>1.74</b>	<b>1.59</b>	<b>1.39</b>	<b>1.52</b>	<b>1.34</b>	<b>1.47</b>
SD	1.68	0.78	0.37	0.17	0.28	0.06	0.34	0.08
Minimum	0.34	1.20	1.32	1.47	0.92	1.46	0.87	1.37
Maximum	4.90	3.70	2.63	2.07	1.67	1.59	1.74	1.56
N	10	10	10	10	10	10	10	10

GSD: geometric standard deviation; MMAD: mass median aerodynamic diameter; NDR: no data recorded, coincidence error probably due to high concentrations; SD: standard deviation

## PAO Usage for Determination of Nominal Concentration

Male Rat Exposures			
Target (mg/m <sup>3</sup> )	20	100	300
Date	PAO Used (g)		
1-May-16	15.2	34.9	103.9
2-May-16	17.2	35.4	108.7
3-May-16	17.3	31	105.8
4-May-16	17.5	31.7	123.2
5-May-16	16.6	31.2	98.3
8-May-16	19.2	33.9	111.5
9-May-16	18.8	38.7	109.4
10-May-16	18.5	30.8	108.5
11-May-16	17.9	33.3	114.9
12-May-16	17.7	32.7	110.5
<b>Average</b>	<b>17.6</b>	<b>33.4</b>	<b>109.5</b>
St Dev	1.2	2.5	6.6
Minimum	15.2	30.8	98.3
Maximum	19.2	38.7	123.2
N	10	10	10

Nominal Concentration= PAO Used / (Air Flow \* Exposure Time)

Female Rat Exposures			
Target (mg/m <sup>3</sup> )	20	100	300
Date	PAO Used (g)		
8-May-16	19.2	33.9	111.5
9-May-16	18.8	38.7	109.4
10-May-16	18.5	30.8	108.5
11-May-16	17.9	33.3	114.9
12-May-16	17.7	32.7	110.5
15-May-16	16.8	31.2	108.4
16-May-16	17.6	29.9	102.7
17-May-16	17.2	33.5	100
18-May-16	17.7	32.6	117.9
19-May-16	14.8	31.4	107
<b>Average</b>	<b>17.6</b>	<b>32.8</b>	<b>109.1</b>
St Dev	1.2	2.4	5.2
Minimum	14.8	29.9	100.0
Maximum	19.2	38.7	117.9
N	10	10	10

Nominal Concentration= PAO Used / (Air Flow \* Exposure Time)



### Daily Ratio of Gravimetric Filter Concentration to Nominal

Male Rat Exposures			
Target (mg/m <sup>3</sup> )	20	100	300
Date	Ratio of Gravimetric Filter to Nominal Concentration (%)	Ratio of Gravimetric Filter to Nominal Concentration (%)	Ratio of Gravimetric Filter to Nominal Concentration (%)
1-May-16	8.3	22.2	22.3
2-May-16	9.7	20.5	22.6
3-May-16	8.9	25.5	21.0
4-May-16	8.6	22.0	18.4
5-May-16	9.2	24.0	25.4
8-May-16	8.1	21.4	19.3
9-May-16	8.2	19.7	19.4
10-May-16	8.3	24.0	21.1
11-May-16	8.6	20.5	18.1
12-May-16	8.9	24.5	21.6
<b>Average</b>	<b>8.7</b>	<b>22.4</b>	<b>20.9</b>
SD	0.5	2.0	2.2
Minimum	8.1	19.7	18.1
Maximum	9.7	25.5	25.4
N	10	10	10

Female Rat Exposures			
Target (mg/m <sup>3</sup> )	20	100	300
Date	Ratio of Gravimetric Filter to Nominal Concentration (%)	Ratio of Gravimetric Filter to Nominal Concentration (%)	Ratio of Gravimetric Filter to Nominal Concentration (%)
8-May-16	8.1	21.4	19.3
9-May-16	8.2	19.7	19.4
10-May-16	8.3	24.0	21.1
11-May-16	8.6	20.5	18.1
12-May-16	8.9	24.5	21.6
15-May-16	9.2	23.0	21.3
16-May-16	8.5	24.1	20.8
17-May-16	8.1	20.9	22.6
18-May-16	8.3	20.7	17.4
19-May-16	10.5	24.0	21.6
<b>Average</b>	<b>8.7</b>	<b>22.3</b>	<b>20.3</b>
SD	0.7	1.8	1.7
Minimum	8.1	19.7	17.4
Maximum	10.5	24.5	22.6
N	<b>8.7</b>	<b>22.3</b>	<b>20.3</b>

## Daily Averages for Environmental Parameters

Date	Study Day	Control Chamber - Male Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
1-May-16	1	25.9	54.9	0.027	223.4
2-May-16	2	22.5	53.5	0.028	230.9
3-May-16	3	22.2	38.7	0.016	229.5
4-May-16	4	22.7	39.1	0.027	225.0
5-May-16	5	22.7	32.9	0.028	226.6
8-May-16	6	22.7	32.9	0.011	227.8
9-May-16	7	22.2	44.8	0.011	228.9
10-May-16	8	22.7	52.7	0.009	227.1
11-May-16	9	22.8	53.2	0.049	225.1
12-May-16	10	22.8	54.3	0.021	226.7
Average		22.9	45.7	0.023	227.1
SD		1.1	9.1	0.012	2.3
Minimum		22.2	32.9	0.009	223.4
Maximum		25.9	54.9	0.049	230.9
N		10	10	10	10

SD = standard deviation

Date	Study Day	Low Exposure Chamber - Male Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
1-May-16	1	25.2	54.0	-0.032	208.6
2-May-16	2	21.6	57.2	-0.047	211.2
3-May-16	3	21.0	41.5	-0.028	210.6
4-May-16	4	21.2	42.4	-0.034	207.3
5-May-16	5	21.0	36.3	-0.035	208.9
8-May-16	6	21.4	33.5	-0.029	208.9
9-May-16	7	21.5	48.4	-0.042	208.6
10-May-16	8	21.4	55.4	-0.043	208.5
11-May-16	9	21.5	55.6	-0.049	209.4
12-May-16	10	21.7	56.4	-0.048	208.5
Average		21.7	48.1	-0.039	209.1
SD		1.2	9.0	0.008	1.1
Minimum		21.0	33.5	-0.049	207.3
Maximum		25.2	57.2	-0.028	211.2
N		10	10	10	10

SD = standard deviation

Date	Study Day	Intermediate Exposure Chamber - Male Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
1-May-16	1	25.2	53.4	-0.042	201.3
2-May-16	2	21.8	55.7	-0.048	205.2
3-May-16	3	21.0	39.3	-0.025	202.9
4-May-16	4	21.4	42.6	-0.035	201.4
5-May-16	5	21.3	36.0	-0.033	202.8
8-May-16	6	21.9	34.5	-0.042	202.2
9-May-16	7	21.7	43.9	-0.040	203.1
10-May-16	8	21.7	54.5	-0.043	202.6
11-May-16	9	21.8	55.5	-0.045	202.9
12-May-16	10	21.9	58.9	-0.043	202.6
Average		22.0	47.4	-0.040	202.7
SD		1.2	9.1	0.007	1.1
Minimum		21.0	34.5	-0.048	201.3
Maximum		25.2	58.9	-0.025	205.2
N		10	10	10	10

SD = standard deviation

Date	Study Day	High Exposure Chamber - Male Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
1-May-16	1	24.2	56.7	-0.025	206.1
2-May-16	2	21.1	52.9	-0.032	210.6
3-May-16	3	20.8	39.4	-0.020	210.2
4-May-16	4	21.5	40.3	-0.036	208.3
5-May-16	5	21.5	32.8	-0.036	209.8
8-May-16	6	22.0	31.1	-0.044	208.5
9-May-16	7	21.9	43.1	-0.041	209.8
10-May-16	8	21.8	52.5	-0.045	209.7
11-May-16	9	21.9	52.4	-0.047	210.4
12-May-16	10	22.0	53.5	-0.048	208.2
Average		21.9	45.5	-0.037	209.1
SD		0.9	9.3	0.010	1.4
Minimum		20.8	31.1	-0.048	206.1
Maximum		24.2	56.7	-0.020	210.6
N		10	10	10	10

SD = standard deviation

Date	Study Day	Control Chamber - Female Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
8-May-16	6	22.7	32.9	0.011	227.8
9-May-16	7	22.2	44.8	0.011	228.9
10-May-16	8	22.7	52.7	0.009	227.1
11-May-16	9	22.8	53.2	0.049	225.2
12-May-16	10	22.8	54.3	0.021	226.7
15-May-16	11	22.4	35.5	0.017	229.9
16-May-16	12	22.0	36.2	0.019	232.1
17-May-16	13	21.5	51.9	0.010	227.2
18-May-16	14	21.5	40.1	0.044	227.7
19-May-16	15	21.3	43.9	0.049	229.0
Average		22.2	44.6	0.024	228.2
SD		0.6	8.2	0.017	1.9
Minimum		21.3	32.9	0.009	225.2
Maximum		22.8	54.3	0.049	232.1
N		10	10	10	10

SD = standard deviation

Date	Study Day	Low Exposure Chamber - Female Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
8-May-16	6	21.4	33.5	-0.029	208.9
9-May-16	7	21.5	48.4	-0.042	208.6
10-May-16	8	21.4	55.4	-0.043	208.5
11-May-16	9	21.5	55.6	-0.049	209.4
12-May-16	10	21.7	56.4	-0.048	208.5
15-May-16	11	21.5	36.6	-0.051	209.5
16-May-16	12	21.1	35.8	-0.051	211.2
17-May-16	13	20.8	52.1	-0.050	208.5
18-May-16	14	20.8	39.7	-0.059	207.1
19-May-16	15	19.4	42.7	-0.134	201.4
Average		21.1	45.6	-0.056	208.2
SD		0.7	9.0	0.029	2.6
Minimum		19.4	33.5	-0.134	201.4
Maximum		21.7	56.4	-0.029	211.2
N		10	10	10	10

SD = standard deviation

Date	Study Day	Intermediate Exposure Chamber - Female Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
8-May-16	6	21.9	34.5	-0.042	202.2
9-May-16	7	21.7	43.9	-0.040	203.1
10-May-16	8	21.7	54.5	-0.043	202.6
11-May-16	9	21.8	55.5	-0.045	202.9
12-May-16	10	21.9	58.9	-0.043	202.6
15-May-16	11	21.6	36.5	-0.048	204.0
16-May-16	12	21.2	36.0	-0.048	203.9
17-May-16	13	20.9	51.5	-0.042	203.4
18-May-16	14	20.9	39.2	-0.050	202.0
19-May-16	15	20.8	43.1	-0.050	203.3
Average		21.4	45.4	-0.045	203.0
SD		0.4	9.0	0.004	0.7
Minimum		20.8	34.5	-0.050	202.0
Maximum		21.9	58.9	-0.040	204.0
N		10	10	10	10

SD = standard deviation

Date	Study Day	High Exposure Chamber - Female Rat Exposures			
		Average Temperature (°C)	Average Relative Humidity (%)	Average Static Pressure (inches of H <sub>2</sub> O)	Average Air Flow (L/min)
8-May-16	6	22.0	31.1	-0.044	208.5
9-May-16	7	21.9	43.1	-0.041	209.8
10-May-16	8	21.8	52.5	-0.045	209.7
11-May-16	9	21.9	52.4	-0.047	210.4
12-May-16	10	22.0	53.5	-0.048	208.2
15-May-16	11	21.8	34.2	-0.053	209.0
16-May-16	12	21.3	34.3	-0.051	209.6
17-May-16	13	20.9	50.3	-0.045	209.0
18-May-16	14	21.0	37.3	-0.055	207.7
19-May-16	15	20.9	42.0	-0.050	208.5
Average		21.6	43.1	-0.048	209.0
SD		0.5	8.6	0.004	0.8
Minimum		20.9	31.1	-0.055	207.7
Maximum		22.0	53.5	-0.041	210.4
N		10	10	10	10

SD = standard deviation

## APPENDIX J. REPEATED EXPOSURE STUDY NEUROBEHAVIORAL ASSAY OBSERVATIONS

### Male FOB Observations for PAO Repeated Exposure Study

Cage Side Observations				Protocol number PAO REPEATED										
Date	7/21/2015-7/29/15													
Animal			Body	Observational								Clonic	Seizure	Palpebral
ID	Condition	Sex	Weight	Time	Posture	Tremor	Severity	Induction	Spasm	Location	Seizures	Convulsions	Severity	Closure
1	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
21	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
41	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
61	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
3	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
23	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
43	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
63	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
5	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
25	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
45	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
65	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
69	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
27	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
47	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
67	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
9	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
29	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
49	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
7	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
11	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
73	L	M	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A	3
51	M	M	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A	3
71	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
13	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
33	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
53	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
31	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
15	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
35	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
55	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
75	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
17	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
37	L	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
57	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
77	H	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
19	C	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	1
39	L	M	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A	3
59	M	M	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A	2
79	H	M	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A	3
C=control=0 mg/m <sup>3</sup> ; L=low=20 mg/m <sup>3</sup> , M=mid=intermediate=100 mg/m <sup>3</sup> ; H=high=300 mg/m <sup>3</sup>														
												1=Wide Open; 2=Partially Shut; 3=Completely Shut		

Animal			Removal	Handling		Muscle			Fur	Facial		Breathing	Additional
ID	Condition	Sex	Time	Reactivity	Piloerection	Tone	Lacrimation	Salivation	Appearance	Crust	Skin	Pattern	Observations
1	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
21	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
41	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
61	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
3	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
23	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
43	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
63	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
5	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
25	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
45	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
65	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
69	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
27	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
47	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
67	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
9	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
29	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
49	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
7	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
11	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
73	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
51	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
71	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
13	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
33	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
53	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
31	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
15	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
35	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
55	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
75	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
17	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
37	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
57	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
77	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
19	C	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
39	L	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
59	M	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
79	H	M	2:30-4:00	1	0	1	0	0	1	0	1	1	0
				1=Normal					1=Normal				
				4=Passive					3=Wet				

Manipulative Observations				Protocol number		PAO REPEATED							
Date	7/21/2015-7/29/15												
Animal			Approach	Acoustic	Tail Pinch	Visual	Surface	Quantitative Data					
ID	Condition	Sex	Response	Response	Respons	Placing	Righting	Forelimp Grip		ForeAvg	Hindlimb Grip		HindAvg
1	C	M	1	1	1	1	1	0.610	0.640	0.625	0.072	0.133	0.103
21	L	M	1	1	1	1	1	0.415	0.485	0.450	0.085	0.117	0.101
41	M	M	1	1	1	1	1	0.545	0.290	0.418	0.055	0.150	0.103
61	H	M	1	1	1	1	1	0.390	0.445	0.418	0.058	0.073	0.066
3	C	M	1	1	1	1	1	0.520	0.620	0.570	0.131	0.151	0.141
23	L	M	1	1	1	1	1	0.515	0.520	0.518	0.160	0.162	0.161
43	M	M	1	1	1	1	1	0.510	0.490	0.500	0.189	0.217	0.203
63	H	M	1	1	1	1	1	0.610	0.560	0.585	0.093	0.122	0.108
5	C	M	1	1	1	1	1	0.620	0.390	0.505	0.140	0.162	0.151
25	L	M	1	1	1	1	1	0.505	0.600	0.553	0.164	0.163	0.164
45	M	M	1	1	1	1	1	0.510	0.555	0.533	0.128	0.171	0.150
65	H	M	1	1	1	1	1	0.450	0.535	0.493	0.157	0.202	0.180
69	C	M	1	1	1	1	1	0.550	0.660	0.605	0.188	0.216	0.202
27	L	M	1	1	1	1	1	0.425	0.270	0.348	0.163	0.173	0.168
47	M	M	1	1	1	1	1	0.490	0.385	0.438	0.157	0.215	0.186
67	H	M	1	1	1	1	1	0.415	0.495	0.455	0.190	0.180	0.185
9	C	M	1	1	1	1	1	0.355	0.475	0.415	0.186	0.238	0.212
29	L	M	1	1	1	1	1	0.445	0.206	0.326	0.500	0.176	0.338
49	M	M	1	1	1	1	1	0.395	0.430	0.413	0.249	0.199	0.224
7	H	M	1	1	1	1	1	0.550	0.310	0.430	0.247	0.181	0.214
11	C	M	1	1	1	1	1	0.450	0.325	0.388	0.131	0.167	0.149
73	L	M	1	1	1	1	1	0.485	0.505	0.495	0.161	0.155	0.158
51	M	M	1	1	1	1	1	0.415	0.425	0.420	0.134	0.160	0.147
71	H	M	1	1	1	1	1	0.560	0.530	0.545	0.165	0.244	0.205
13	C	M	1	1	1	1	1	0.510	0.485	0.498	0.243	0.206	0.225
33	L	M	1	1	1	1	1	0.455	0.610	0.533	0.246	0.186	0.216
53	M	M	1	1	1	1	1	0.355	0.320	0.338	0.155	0.156	0.156
31	H	M	1	1	1	1	1	0.520	0.375	0.448	0.165	0.229	0.197
15	C	M	1	1	1	1	1	0.510	0.330	0.420	0.286	0.143	0.215
35	L	M	1	1	1	1	1	0.450	0.515	0.483	0.185	0.218	0.202
55	M	M	1	1	1	1	1	0.375	0.365	0.370	0.171	0.165	0.168
75	H	M	1	1	1	1	1	0.460	0.365	0.413	0.227	0.158	0.193
17	C	M	1	1	1	1	1	0.640	0.365	0.503	0.265	0.266	0.266
37	L	M	1	1	1	1	1	0.365	0.490	0.428	0.191	0.223	0.207
57	M	M	1	1	1	1	1	0.370	0.510	0.440	0.146	0.188	0.167
77	H	M	1	1	1	1	1	0.495	0.365	0.430	0.132	0.193	0.163
19	C	M	1	1	1	1	1	0.505	0.465	0.485	0.179	0.252	0.216
39	L	M	1	1	1	1	1	0.425	0.470	0.448	0.209	0.198	0.204
59	M	M	1	1	1	1	1	0.485	0.430	0.458	0.132	0.200	0.166
79	H	M	1	1	1	1	1	0.395	0.315	0.355	0.153	0.274	0.214
								Grip Units=kg (peak value)					



## Female FOB Observations for PAO Repeated Exposure Study

Cage side Observations				Protocol number		PAO REPEATED									
Date		7/21/2015-7/29/15													
Animal			Body	Observational									Clonic	Seizure	Palpebral
ID	Condition	Sex	Weight	Time	Posture	Tremor	Severity	Induction	Spasm	Location	Seizures	Convulsions	Severity	Closure	
2	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
22	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
42	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
62	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
4	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
24	L	F	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A		3
44	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
64	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
6	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
26	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
46	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
66	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
28	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
58	L	F	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A		3
48	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
38	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
10	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		2
30	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
50	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
70	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
12	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
32	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		2
52	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		2
72	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
14	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
34	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
54	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
74	H	F	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A		3
16	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
36	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
56	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
76	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
18	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
68	L	F	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A		3
8	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
78	H	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
20	C	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
40	L	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
60	M	F	ON FILE	2:30-4:00	1	0	N/A	N/A	0	N/A	0	N/A	N/A		1
80	H	F	ON FILE	2:30-4:00	2	0	N/A	N/A	0	N/A	0	N/A	N/A		3
C=control=0 mg/m <sup>3</sup> ; L=low=20 mg/m <sup>3</sup> , M=mid=intermediate=100 mg/m <sup>3</sup> ; H=high=300 mg/m <sup>3</sup>															1=Wide Open; 2=Partially Shut; 3=Completely Shut

Animal			Removal	Handling		Muscle			Fur	Facial		Breathing	Additional
ID	Condition	Sex	Time	Reactivity	Piloerection	Tone	Lacrimation	Salivation	Appearance	Crust	Skin	Pattern	Observations
2	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
22	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
42	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
62	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
4	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
24	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
44	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
64	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
6	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
26	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
46	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
66	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
28	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
58	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
48	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
38	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
10	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
30	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
50	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
70	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
12	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
32	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
52	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
72	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
14	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
34	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
54	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
74	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
16	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
36	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
56	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
76	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
18	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
68	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
8	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
78	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
20	C	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
40	L	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
60	M	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
80	H	F	2:30-4:00	1	0	1	0	0	1	0	1	1	0
				1=Normal					1=Normal				
				4=Passive					3=Wet				

Manipulative Observations			Protocol number		PAO REPEATED								
Date 7/21/2015-7/29/15													
Animal			Approach	Acoustic	Tail Pinch	Visual	Surface	Quantitative Data					
ID	Condition	Sex	Response	Response	Response	Placing	Righting	Forelimp	Grip	ForeAvg	Hindlimb	Grip	HindAvg
2	C	F	1	1	1	1	1	0.395	0.285	0.340	0.109	0.134	0.122
22	L	F	1	1	1	1	1	0.340	0.285	0.313	0.130	0.123	0.127
42	M	F	1	1	1	1	1	0.325	0.215	0.270	0.119	0.102	0.111
62	H	F	1	1	1	1	1	0.305	0.300	0.303	0.095	0.147	0.121
4	C	F	1	1	2	1	1	0.320	0.335	0.328	0.226	0.126	0.176
24	L	F	1	1	1	1	1	0.355	0.315	0.335	0.170	0.153	0.162
44	M	F	1	1	1	1	1	0.285	0.240	0.263	0.141	0.159	0.150
64	H	F	1	1	1	1	1	0.280	0.330	0.305	0.160	0.199	0.180
6	C	F	1	1	1	1	1	0.205	0.365	0.285	0.172	0.159	0.166
26	L	F	1	1	1	1	1	0.260	0.235	0.248	0.176	0.113	0.145
46	M	F	1	1	1	1	1	0.220	0.365	0.293	0.121	0.151	0.136
66	H	F	1	1	1	1	1	0.270	0.235	0.253	0.127	0.120	0.124
28	C	F	1	1	1	1	1	0.415	0.370	0.393	0.146	0.206	0.176
58	L	F	1	1	1	1	1	0.435	0.465	0.450	0.138	0.177	0.158
48	M	F	1	1	1	1	1	0.255	0.350	0.303	0.192	0.200	0.196
38	H	F	1	1	1	1	1	0.270	0.330	0.300	0.145	0.165	0.155
10	C	F	1	1	1	1	1	0.445	0.430	0.438	0.179	0.226	0.203
30	L	F	1	1	1	1	1	0.330	0.280	0.305	0.207	0.215	0.211
50	M	F	1	1	1	1	1	0.505	0.330	0.418	0.217	0.131	0.174
70	H	F	1	1	1	1	1	0.120	0.270	0.195	0.144	0.126	0.135
12	C	F	1	1	1	1	1	0.330	0.310	0.320	0.186	0.155	0.171
32	L	F	1	1	1	1	1	0.295	0.265	0.280	0.179	0.219	0.199
52	M	F	1	1	1	1	1	0.285	0.305	0.295	0.117	0.232	0.175
72	H	F	1	1	1	1	1	0.310	0.215	0.263	0.122	0.147	0.135
14	C	F	1	1	1	1	1	0.330	0.280	0.305	0.168	0.189	0.179
34	L	F	1	1	1	1	1	0.295	0.295	0.295	0.151	0.147	0.149
54	M	F	1	1	1	1	1	0.235	0.295	0.265	0.127	0.186	0.157
74	H	F	1	1	1	1	1	0.320	0.265	0.293	0.180	0.252	0.216
16	C	F	1	1	1	1	1	0.245	0.175	0.210	0.107	0.119	0.113
36	L	F	1	1	1	1	1	0.315	0.155	0.235	0.107	0.111	0.109
56	M	F	1	1	1	1	1	0.240	0.270	0.255	0.144	0.143	0.144
76	H	F	1	1	1	1	1	0.365	0.175	0.270	0.143	0.158	0.151
18	C	F	1	1	1	1	1	0.280	0.325	0.303	0.186	0.140	0.163
68	L	F	1	1	1	1	1	0.165	0.160	0.163	0.166	0.142	0.154
8	M	F	1	1	1	1	1	0.365	0.280	0.323	0.149	0.174	0.162
78	H	F	1	1	1	1	1	0.270	0.215	0.243	0.143	0.136	0.140
20	C	F	1	1	1	1	1	0.290	0.365	0.328	0.209	0.198	0.204
40	L	F	1	1	1	1	1	0.295	0.415	0.355	0.123	0.160	0.142
60	M	F	1	1	1	1	1	0.325	0.255	0.290	0.114	0.177	0.146
80	H	F	1	1	1	1	1	0.215	0.245	0.230	0.107	0.124	0.116
								Grip Units=kg (peak value)					

## Male Motor Activity Observations for PAO Repeated Exposure Study

Motor Activity Measurements				Protocol number		PAO REPEATED					
Date	7/21/2015-7/29/15										
Session ID	Subject ID	Condition	Sex	Total Distance	Actual Distance	Average Speed	Actual Speed	Total Resting Time	Actual Resting Time	Activity Time	Total Rears
PAOMAM051216R1	1	C	M	10126.9	1012.69	39.26113206	3.93	10026	1002.60	797.40	44
PAOMAM051216R1	21	L	M	11209.2	1120.92	37.33343718	3.73	9468	946.80	853.20	72
PAOMAM051216R1	41	M	M	5930.2	593.02	36.95980913	3.70	10013	1001.30	798.70	19
PAOMAM051216R1	61	H	M	13564.2	1356.42	43.38320537	4.34	10567	1056.70	743.30	59
PAOMAM051216R1	3	C	M	7259.2	725.92	37.37399999	3.74	11727	1172.70	627.30	42
PAOMAM051216R1	23	L	M	13233.6	1323.36	37.83243499	3.78	9408	940.80	859.20	210
PAOMAM051216R1	43	M	M	8753.5	875.35	34.56312888	3.46	11340	1134.00	666.00	48
PAOMAM051216R1	63	H	M	12107.2	1210.72	39.34273505	3.93	10115	1011.50	788.50	71
PAOMAM051216R2	25	L	M	10137.5	1013.75	39.39077882	3.94	10944	1094.40	705.60	48
PAOMAM051216R2	45	M	M	17172	1717.20	41.96724875	4.20	6975	697.50	1102.50	65
PAOMAM051216R2	65	H	M	9796.60001	979.66	43.34286679	4.33	11473	1147.30	652.70	40
PAOMAM051216R2	69	C	M	19420	1942.00	46.48632143	4.65	8544	854.40	945.60	89
PAOMAM051216R2	27	L	M	17321.1	1732.11	42.92845234	4.29	8794	879.40	920.60	71
PAOMAM051216R2	47	M	M	16117	1611.70	40.37141751	4.04	8343	834.30	965.70	435
PAOMAM051216R2	67	H	M	17337	1733.70	38.49040859	3.85	8067	806.70	993.30	71
PAOMAM051216R2	5	C	M	18270.5	1827.05	41.28029124	4.13	8771	877.10	922.90	111
PAOMAM051216R3	49	M	M	21299.9	2129.99	41.10711945	4.11	6812	681.20	1118.80	101
PAOMAM051216R3	7	H	M	16653.6	1665.36	43.63271926	4.36	9053	905.30	894.70	67
PAOMAM051216R3	11	C	M	18360.6	1836.06	38.08931944	3.81	6941	694.10	1105.90	109
PAOMAM051216R3	73	L	M	17156.8	1715.68	44.68820313	4.47	9074	907.40	892.60	64
PAOMAM051216R3	51	M	M	11453.5	1145.35	39.479887	3.95	9103	910.30	889.70	53
PAOMAM051216R3	71	H	M	26850.6	2685.06	45.52466173	4.55	5822	582.20	1217.80	256
PAOMAM051216R3	9	C	M	19942.6	1994.26	41.94880799	4.19	7158	715.80	1084.20	89
PAOMAM051216R3	29	L	M	20846.3	2084.63	44.27972888	4.43	7018	701.80	1098.20	103
PAOMAM051216R4	31	H	M	15648.2	1564.82	41.07932406	4.11	8085	808.50	991.50	55
PAOMAM051216R4	15	C	M	19789.2	1978.92	43.50880482	4.35	7997	799.70	1000.30	105
PAOMAM051216R4	35	L	M	15087.3	1508.73	39.52763545	3.95	8143	814.30	985.70	75
PAOMAM051216R4	55	M	M	16159.5	1615.95	44.09309907	4.41	8738	873.80	926.20	36
PAOMAM051216R4	75	H	M	21322.8	2132.28	45.4994429	4.55	7855	785.50	1014.50	127
PAOMAM051216R4	13	C	M	24183.4	2418.34	45.02344524	4.50	6042	604.20	1195.80	172
PAOMAM051216R4	33	L	M	23085.3	2308.53	40.60928633	4.06	4953	495.30	1304.70	71
PAOMAM051216R4	53	M	M	20064.7	2006.47	42.83043061	4.28	8162	816.20	983.80	86
PAOMAM051216R5	19	C	M	10752.1	1075.21	41.81399522	4.18	7539	753.90	1046.10	32
PAOMAM051216R5	39	L	M	15575.7	1557.57	42.39652746	4.24	8220	822.00	978.00	56
PAOMAM051216R5	59	M	M	25781.5	2578.15	45.51183216	4.55	5762	576.20	1223.80	101
PAOMAM051216R5	79	H	M	26142.1	2614.21	44.72881526	4.47	5564	556.40	1243.60	128
PAOMAM051216R5	17	C	M	13363.4	1336.34	40.73190883	4.07	9357	935.70	864.30	93
PAOMAM051216R5	37	L	M	17568.2	1756.82	40.74965815	4.07	7070	707.00	1093.00	113
PAOMAM051216R5	57	M	M	19744.8	1974.48	41.30815757	4.13	7184	718.40	1081.60	91
PAOMAM051216R5	77	H	M	24259.2	2425.92	44.63165064	4.46	5856	585.60	1214.40	102
		Units		cm	cm		cm/sec	sec	sec of 1800	sec of 1800	#
		C=control=0 mg/m^3; L=low=20 mg/m^3;									
		M=mid=intermediate=100 mg/m^3; H=high=300 mg/m^3									

Subject ID	Condition	Sex	1st 10 Perimeter Beam Breaks	1st 10 Center Beam Breaks	Total Beam Breaks	% in Center	Fine Total	Ambulatory Total	Resting Time Parameter	Perimeter Settings	Chamber
1	C	M	534	783	1317.00	59.45	249	1885	4 sec	X = 3 and Y = 3	1
21	L	M	560	580	1140.00	50.88	238	2295	4 sec	X = 3 and Y = 3	2
41	M	M	288	681	969.00	70.28	200	1142	4 sec	X = 3 and Y = 3	3
61	H	M	864	1161	2025.00	57.33	237	2539	4 sec	X = 3 and Y = 3	4
3	C	M	576	616	1192.00	51.68	254	1377	4 sec	X = 3 and Y = 3	5
23	L	M	663	681	1344.00	50.67	263	2539	4 sec	X = 3 and Y = 3	6
43	M	M	562	607	1169.00	51.92	232	1679	4 sec	X = 3 and Y = 3	7
63	H	M	830	884	1714.00	51.58	274	2354	4 sec	X = 3 and Y = 3	8
25	L	M	760	398	1158.00	34.37	232	1882	4 sec	X = 3 and Y = 3	1
45	M	M	764	798	1562.00	51.09	253	3055	4 sec	X = 3 and Y = 3	2
65	H	M	657	565	1222.00	46.24	284	1790	4 sec	X = 3 and Y = 3	3
69	C	M	933	1365	2298.00	59.40	229	3523	4 sec	X = 3 and Y = 3	4
27	L	M	984	1021	2005.00	50.92	293	3321	4 sec	X = 3 and Y = 3	5
47	M	M	978	730	1708.00	42.74	218	3081	4 sec	X = 3 and Y = 3	6
67	H	M	565	855	1420.00	60.21	221	3372	4 sec	X = 3 and Y = 3	7
5	C	M	849	1330	2179.00	61.04	254	3577	4 sec	X = 3 and Y = 3	8
49	M	M	1166	526	1692.00	31.09	263	4001	4 sec	X = 3 and Y = 3	1
7	H	M	1033	796	1829.00	43.52	257	3075	4 sec	X = 3 and Y = 3	2
11	C	M	826	939	1765.00	53.20	251	3633	4 sec	X = 3 and Y = 3	3
73	L	M	859	978	1837.00	53.24	275	3161	4 sec	X = 3 and Y = 3	4
51	M	M	679	555	1234.00	44.98	255	2139	4 sec	X = 3 and Y = 3	5
71	H	M	993	1433	2426.00	59.07	218	4776	4 sec	X = 3 and Y = 3	6
9	C	M	896	1262	2158.00	58.48	269	3779	4 sec	X = 3 and Y = 3	7
29	L	M	828	890	1718.00	51.80	236	3911	4 sec	X = 3 and Y = 3	8
31	H	M	944	652	1596.00	40.85	336	2965	4 sec	X = 3 and Y = 3	1
15	C	M	986	1099	2085.00	52.71	272	3654	4 sec	X = 3 and Y = 3	2
35	L	M	727	418	1145.00	36.51	267	2818	4 sec	X = 3 and Y = 3	3
55	M	M	692	492	1184.00	41.55	221	2808	4 sec	X = 3 and Y = 3	4
75	H	M	1065	1066	2131.00	50.02	267	4004	4 sec	X = 3 and Y = 3	5
13	C	M	972	905	1877.00	48.22	249	4411	4 sec	X = 3 and Y = 3	6
33	L	M	1023	832	1855.00	44.85	274	4072	4 sec	X = 3 and Y = 3	7
53	M	M	996	1047	2043.00	51.25	290	3840	4 sec	X = 3 and Y = 3	8
19	C	M	729	643	1372.00	46.87	303	1991	4 sec	X = 3 and Y = 3	1
39	L	M	596	877	1473.00	59.54	234	2692	4 sec	X = 3 and Y = 3	2
59	M	M	1113	995	2108.00	47.20	229	4705	4 sec	X = 3 and Y = 3	3
79	H	M	1199	1327	2526.00	52.53	295	5027	4 sec	X = 3 and Y = 3	4
17	C	M	862	552	1414.00	39.04	248	2526	4 sec	X = 3 and Y = 3	5
37	L	M	765	987	1752.00	56.34	269	3319	4 sec	X = 3 and Y = 3	6
57	M	M	1240	907	2147.00	42.24	312	3896	4 sec	X = 3 and Y = 3	7
77	H	M	1663	1109	2772.00	40.01	299	4542	4 sec	X = 3 and Y = 3	8
Units			#	#	#	%	#				

## Female Motor Activity Observations for PAO Repeated Exposure Study

Motor Activity Measurements				Protocol number		PAO REPEATED				
Date	7/21/2015-7/29/15									
Session ID	Subject ID	Condition	Sex	Total Distance	Actual Distance	Average Speed	Actual Speed	Total Resting Time	Activity Time	Total Rears
PAOMAF051916R1	2	C	F	11402.54	1140.25	24.15	2.42	1046.2	753.80	49
PAOMAF051916R1	22	L	F	16831.31	1683.13	29.228	2.92	886.6	913.40	82
PAOMAF051916R1	42	M	F	11447.73	1144.77	21.752	2.18	1079	721.00	62
PAOMAF051916R1	62	H	F	11955.62	1195.56	25.228	2.52	1105.3	694.70	55
PAOMAF051916R1	4	C	F	16760.39	1676.04	33.275	3.33	903.3	896.70	92
PAOMAF051916R1	24	L	F	17378.94	1737.89	32.097	3.21	877.5	922.50	332
PAOMAF051916R1	44	M	F	19426.97	1942.70	30.22	3.02	694.8	1105.20	83
PAOMAF051916R1	64	H	F	13764.34	1376.43	28.806	2.88	1010.1	789.90	63
PAOMAF051916R2	26	L	F	18398.52	1839.85	27.462	2.75	717.8	1082.20	105
PAOMAF051916R2	46	M	F	17613.28	1761.33	31.027	3.10	812.4	987.60	64
PAOMAF051916R2	66	H	F	21428.26	2142.83	28.83	2.88	708.5	1091.50	118
PAOMAF051916R2	28	C	F	16297.72	1629.77	31.494	3.15	970.1	829.90	80
PAOMAF051916R2	58	L	F	20726.55	2072.65	29.326	2.93	730	1070.00	110
PAOMAF051916R2	48	M	F	21368.52	2136.85	30.104	3.01	679.6	1120.40	238
PAOMAF051916R2	38	H	F	11529.63	1152.96	21.957	2.20	1037.2	762.80	89
PAOMAF051916R2	6	C	F	20375.61	2037.56	30.423	3.04	836.4	963.60	94
PAOMAF051916R3	50	M	F	18956.43	1895.64	28.467	2.85	771.5	1028.50	125
PAOMAF051916R3	70	H	F	19710.9	1971.09	30.833	3.08	892.6	907.40	62
PAOMAF051916R3	12	C	F	15867.35	1586.73	27.549	2.75	976.8	823.20	70
PAOMAF051916R3	32	L	F	14598.24	1459.82	21.764	2.18	1033.8	766.20	76
PAOMAF051916R3	52	M	F	21396.58	2139.66	30.802	3.08	754.5	1045.50	149
PAOMAF051916R3	72	H	F	13574.78	1357.48	26.256	2.63	1089.4	710.60	275
PAOMAF051916R3	10	C	F	10194.1	1019.41	22.465	2.25	1164.6	635.40	65
PAOMAF051916R3	30	L	F	20901.25	2090.13	29.579	2.96	733.6	1066.40	128
PAOMAF051916R4	74	H	F	14271.28	1427.13	26.165	2.62	966.2	833.80	67
PAOMAF051916R4	16	C	F	21211.21	2121.12	32.297	3.23	730.9	1069.10	127
PAOMAF051916R4	36	L	F	17314.14	1731.41	27.725	2.77	857.8	942.20	67
PAOMAF051916R4	56	M	F	20958.11	2095.81	31.326	3.13	671.9	1128.10	80
PAOMAF051916R4	76	H	F	16444.34	1644.43	30.96	3.10	947.6	852.40	99
PAOMAF051916R4	14	C	F	15640.81	1564.08	23.691	2.37	844.5	955.50	152
PAOMAF051916R4	34	L	F	14422.98	1442.30	27.187	2.72	787.6	1012.40	82
PAOMAF051916R4	54	M	F	18991.42	1899.14	28.767	2.88	828.3	971.70	95
PAOMAF051916R5	20	C	F	13490.75	1349.08	26.563	2.66	989.1	810.90	64
PAOMAF051916R5	40	L	F	18982.62	1898.26	29.923	2.99	668.8	1131.20	132
PAOMAF051916R5	60	M	F	20564.82	2056.48	31.278	3.13	721.9	1078.10	87
PAOMAF051916R5	80	H	F	19614.59	1961.46	32.444	3.24	772.3	1027.70	67
PAOMAF051916R5	18	C	F	19259.4	1925.94	30.279	3.03	804.6	995.40	134
PAOMAF051916R5	68	L	F	24237.9	2423.79	30.068	3.01	555.4	1244.60	185
PAOMAF051916R5	8	M	F	15955.22	1595.52	26.576	2.66	830.1	969.90	115
PAOMAF051916R5	78	H	F	17285.39	1728.54	31.331	3.13	932.4	867.60	69
		Units		cm	cm		cm/sec	sec	sec of 1800	#
		C=control=0 mg/m^3; L=low=20 mg/m^3,								
		M=mid=intermediate=100 mg/m^3; H=high=300 mg/m^3								

Subject ID	Condition	Sex	1st 10 Perimeter Beam Breaks	1st 10 Center Beam Breaks	Total Beam Breaks	% in Center	Fine Total	Ambulatory Total	Resting Time Parameter	Perimeter Settings	Chamber
2	C	F	959	395	1354.00	29.17	368	2423	4 sec	X = 3 and Y = 3	1
22	L	F	1057	1065	2122.00	50.19	246	3363	4 sec	X = 3 and Y = 3	2
42	M	F	757	736	1493.00	49.30	283	2416	4 sec	X = 3 and Y = 3	3
62	H	F	986	703	1689.00	41.62	293	2598	4 sec	X = 3 and Y = 3	4
4	C	F	663	677	1340.00	50.52	261	3216	4 sec	X = 3 and Y = 3	5
24	L	F	774	909	1683.00	54.01	230	3500	4 sec	X = 3 and Y = 3	6
44	M	F	844	910	1754.00	51.88	269	3925	4 sec	X = 3 and Y = 3	7
64	H	F	806	736	1542.00	47.73	295	2811	4 sec	X = 3 and Y = 3	8
26	L	F	1323	467	1790.00	26.09	277	3894	4 sec	X = 3 and Y = 3	1
46	M	F	770	611	1381.00	44.24	244	3552	4 sec	X = 3 and Y = 3	2
66	H	F	1173	559	1732.00	32.27	247	4554	4 sec	X = 3 and Y = 3	3
28	C	F	1058	870	1928.00	45.12	329	3441	4 sec	X = 3 and Y = 3	4
58	L	F	1020	1004	2024.00	49.60	242	4214	4 sec	X = 3 and Y = 3	5
48	M	F	1157	858	2015.00	42.58	339	4369	4 sec	X = 3 and Y = 3	6
38	H	F	752	613	1365.00	44.91	244	2435	4 sec	X = 3 and Y = 3	7
6	C	F	1270	1001	2271.00	44.08	247	3855	4 sec	X = 3 and Y = 3	8
50	M	F	1390	797	2187.00	36.44	241	3976	4 sec	X = 3 and Y = 3	1
70	H	F	961	894	1855.00	48.19	351	3801	4 sec	X = 3 and Y = 3	2
12	C	F	1172	825	1997.00	41.31	255	3279	4 sec	X = 3 and Y = 3	3
32	L	F	1235	791	2026.00	39.04	261	3092	4 sec	X = 3 and Y = 3	4
52	M	F	1282	1007	2289.00	43.99	285	4279	4 sec	X = 3 and Y = 3	5
72	H	F	1172	660	1832.00	36.03	294	2926	4 sec	X = 3 and Y = 3	6
10	C	F	970	320	1290.00	24.81	326	2193	4 sec	X = 3 and Y = 3	7
30	L	F	1450	935	2385.00	39.20	271	4392	4 sec	X = 3 and Y = 3	8
74	H	F	1192	534	1726.00	30.94	310	2888	4 sec	X = 3 and Y = 3	1
16	C	F	1140	565	1705.00	33.14	288	4347	4 sec	X = 3 and Y = 3	2
36	L	F	1131	724	1855.00	39.03	217	3624	4 sec	X = 3 and Y = 3	3
56	M	F	1136	760	1896.00	40.08	308	4114	4 sec	X = 3 and Y = 3	4
76	H	F	886	532	1418.00	37.52	306	3419	4 sec	X = 3 and Y = 3	5
14	C	F	1017	446	1463.00	30.49	329	3102	4 sec	X = 3 and Y = 3	6
34	L	F	1017	498	1515.00	32.87	335	2938	4 sec	X = 3 and Y = 3	7
54	M	F	1236	944	2180.00	43.30	312	3780	4 sec	X = 3 and Y = 3	8
20	C	F	1158	516	1674.00	30.82	265	2806	4 sec	X = 3 and Y = 3	1
40	L	F	962	770	1732.00	44.46	305	4034	4 sec	X = 3 and Y = 3	2
60	M	F	1219	925	2144.00	43.14	263	4258	4 sec	X = 3 and Y = 3	3
80	H	F	1081	746	1827.00	40.83	279	3880	4 sec	X = 3 and Y = 3	4
18	C	F	1286	786	2072.00	37.93	292	3959	4 sec	X = 3 and Y = 3	5
68	L	F	1561	1124	2685.00	41.86	265	4993	4 sec	X = 3 and Y = 3	6
8	M	F	1266	600	1866.00	32.15	292	3493	4 sec	X = 3 and Y = 3	7
78	H	F	1036	561	1597.00	35.13	377	3519	4 sec	X = 3 and Y = 3	8
Units			#	#	#	%	#				

## APPENDIX K. REPEATED EXPOSURE STUDY IN-LIFE WEIGHT DATA

### Male and Female Body Weight Measurements for PAO Repeated Exposure Study

Control Exposure Group		Weight in grams							
Male Rats									
Animal ID	Quarantine -->	<-- Quarantine		Acclimation -->		<-- Acclimation			
	12-Apr-16	15-Apr-16	22-Apr-16	25-Apr-16	26-Apr-16	27-Apr-16	28-Apr-16	29-Apr-16	
1	100.27	116.06	149.33	160.64	167.22	170.87	174.13	177.12	
3	116.28	132.49	172.41	190.52	194.08	199.63	206.37	210.29	
5	103	120.33	159.35	169.12	177.62	179.25	183.53	185.7	
69	117.47	134.03	171.69	185.7	193.43	198.22	201.31	208.38	
9	101.92	116.71	154.39	167.04	170.89	175.24	176.58	180.25	
11	111.91	127.34	156.98	165.88	170.23	173.21	175.97	179.25	
13	113.94	128.13	169.79	181.28	186.33	191.11	194.34	198.17	
15	102.94	120.3	156.9	173.04	178.03	182.86	184.92	187.29	
17	111.71	125.55	159.43	172.68	174.92	181.08	183.34	185.01	
19	104.6	117.22	148.86	160.48	165	170.3	174.11	175.78	

Female Rats									
Animal ID	Quarantine -->	<-- Quarantine		Acclimation -->		<-- Acclimation			
	12-Apr-16	15-Apr-16	22-Apr-16	29-Apr-16	2-May-16	3-May-16	4-May-16	5-May-16	6-May-16
2	86.3	94.94	111.56	125.53	126.84	128.93	129.57	130.55	134.03
4	93.71	101.67	121.34	135.25	137.09	137.84	140.16	142.01	140.18
6	93.69	105.95	127.41	141.42	145.63	145.74	146.74	146.85	148.65
28	92.29	100.18	116.31	125.98	128.78	125.69	127.38	129.23	131.18
10	88.72	98.16	115.49	129.09	129.25	129.47	132.86	133.91	137.28
12	80.91	90.51	105.48	119.45	124.79	123.92	126.23	128.33	129.99
14	96.54	108.26	127.85	144.06	143.86	145.86	146.36	150.29	149.3
16	77.38	86.45	101.83	115.38	117.13	118.29	117.48	119.67	120.87
18	88.81	96.39	118.36	128.54	133.49	134.31	135.78	138.15	140.71
20	70.83	79.87	97.36	111.41	114.64	115.25	118.88	119.08	121.28

Control Exposure Group		Weight in grams										
Male Rats												
Animal ID	Exposure -->	<-- Exposure									Necropsy	
	1-May-16	2-May-16	3-May-16	4-May-16	5-May-16	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	13-May-16	
1	182.29	187.8	187.97	192.45	194.47	200.28	205.33	206.77	209.57	210.45	198.24	
3	218.44	222.56	224.09	225.77	226.71	235.9	241.14	244.3	244.27	246.35	234.19	
5	193	197.41	199.24	199.63	201.01	210.96	211.37	213	216.94	217.26	205.51	
69	216.54	221.25	223.75	226.19	228.99	243	245.01	247.54	249.81	249.68	237.91	
9	187.42	191.31	194.68	197.47	196.1	196.98	202.47	208.33	210.39	209.14	199.4	
11	185.2	186.58	186.64	188.6	189.02	196.81	197.98	201.46	203.21	202.69	190.7	
13	202.23	207.94	207.82	208.88	210.36	219.24	222.94	224.72	226.42	228.35	216.09	
15	194.33	199.72	202.57	200.6	206.91	211.43	212.23	217.72	218.8	223.51	208.51	
17	196.58	196.78	199.93	201.6	201.98	210.55	212.91	214.93	216.46	216.71	205.04	
19	182.14	187.46	190.67	194.04	197.04	208.45	209.51	212.48	215.3	217.09	204.13	

Female Rats												
Animal ID	Exposure -->	<-- Exposure									Necropsy	
	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	15-May-16	16-May-16	17-May-16	18-May-16	19-May-16	20-May-16	
2	137.97	136.91	136.55	140.92	136.96	142.31	141.46	141.69	143.19	145.26	140.06	
4	147.83	145.75	145.19	149.95	146.38	153.88	155.11	155.41	155.96	156.84	150.99	
6	153.13	153.46	154.04	156.27	155.84	158.67	161.19	161.83	161.44	163.25	154.95	
28	132.98	132.05	134.92	137.2	135.99	139.99	138.59	137.82	140.72	141.14	133.5	
10	138.31	141.74	142.16	145.75	143.53	148.59	147.59	147.71	145.63	147.91	140.99	
12	135.43	134.56	134.59	134.89	135.73	139.65	141.07	141.03	145.27	142.4	137.88	
14	155.52	157.19	154.84	155.91	156.81	159.83	163.67	162.61	163.3	164.95	153.1	
16	122.63	122.97	121.71	125.91	123.85	124.5	129.34	129.48	131.21	131.87	125.08	
18	144.38	143.4	146.84	152.31	147.79	153.74	157.88	157.22	158.93	155.81	152.32	
20	125.32	124.49	124.95	128.15	128.51	130.69	129.57	132.15	132.88	131.65	125.67	



Low Exposure Group		Weight in grams							
Male Rats									
Animal	Quarantine -->	<-- Quarantine				Acclimation -->			
ID	12-Apr-16	15-Apr-16	22-Apr-16	25-Apr-16	26-Apr-16	27-Apr-16	28-Apr-16	29-Apr-16	
21	90.58	108.08	141.48	153.58	158.14	162.82	166.47	167.97	
23	92.2	107.12	138.8	155.11	160.16	162.39	169.24	171.7	
25	114.51	132.28	171.85	187.79	195.19	198.17	202.7	206.39	
27	91.64	102.98	129.43	140.77	143.71	149.27	153.04	154.32	
29	108.5	123.27	160.72	174.64	181.72	184.58	186.07	193.27	
73	113.23	130.31	171.26	185.52	192.84	196.67	200.73	200.82	
33	138.23	156	188.23	198.8	203.09	208.66	211.57	209.46	
35	106.66	119.59	156.08	170.29	175.01	179.33	181.16	187.49	
37	111.38	128.05	166.52	177.32	184.62	185.42	188.97	192.9	
39	113.35	129.99	162.78	174.38	179.09	183.6	187.19	187.64	
Female Rats									
Animal	Quarantine -->	<-- Quarantine				Acclimation -->			
ID	12-Apr-16	15-Apr-16	22-Apr-16	29-Apr-16	2-May-16	3-May-16	4-May-16	5-May-16	6-May-16
22	92.8	100.56	115.89	125.16	129.33	128.48	130.09	131.38	134.54
24	78.46	86.63	106.66	120.69	121.84	123.72	123.17	123.14	125.9
26	85.53	95.41	113.64	123.59	127.81	126.41	128.85	131.37	133.66
58	96.24	105.59	123.75	136.65	135.47	139.1	140	141.68	142.19
30	96.11	105.57	120.57	137.53	136.18	139.28	140.45	144.78	145.52
32	86.84	96.57	115.01	125.6	131.38	131.9	131.18	136.02	136.24
34	79.92	89.36	108.63	126.18	127.91	130.04	133.7	135.67	137.51
36	80.95	91.26	113.57	129.9	134.19	135.14	135.35	136.84	140.89
68	75.43	85.59	101.05	114.64	123.1	117.05	119.72	121.04	121.94
40	86.54	95.95	114.96	128.3	131.74	130.54	132.1	133.34	136.4

Low Exposure Group		Weight in grams									
Male Rats											
Animal	Exposure -->	<-- Exposure									Necropsy
ID	1-May-16	2-May-16	3-May-16	4-May-16	5-May-16	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	13-May-16
21	176.22	179.55	180.53	182.19	185.45	193.09	195.38	196.98	199.15	200.12	189.85
23	180.52	185.14	185.26	188.08	190.89	199.62	203.31	206.4	206.36	208.41	196.58
25	213.48	216.36	216.65	217.52	221.55	230.01	231.64	235.38	240.1	238.47	226.8
27	159.55	162.06	164.14	166.52	169.69	178.66	178.17	183.01	184.7	186.46	175.23
29	198.65	201.49	201.32	208.04	209.28	218.93	221.17	222.95	228.37	227.14	215.43
73	210.34	214.13	214.98	215.33	216.86	228.84	225.91	232.39	235.9	233.41	221.89
33	217.67	219.87	220.91	223.34	225.49	231.45	236.01	239.79	241.85	240.65	228.94
35	191.05	197.2	197.9	199.81	201.76	211.2	213.33	217.41	216.45	217.57	205.47
37	196.52	199.1	200.89	203.15	205.51	209.57	212.48	214.62	219.54	217.77	207.41
39	194.14	196.8	197.1	198.01	201.29	209.82	209.77	210.34	216.21	215.59	203.84
Female Rats											
Animal	Exposure -->	<-- Exposure									Necropsy
ID	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	15-May-16	16-May-16	17-May-16	18-May-16	19-May-16	20-May-16
22	136.97	134.9	135.33	138.54	140.67	143.07	143.07	145.78	146.5	145.76	140.57
24	131.47	129.08	127.12	132.62	131.1	138.15	138.15	137.28	138.13	137.6	130.69
26	132.79	135.74	136.59	138.38	137.52	142.44	142.44	142.91	148.11	147.97	139.99
58	146.36	146.48	144.1	147	145.15	152.54	152.54	151.07	156.2	155.8	149.31
30	147.9	147.31	148.59	148.85	147.25	155.86	155.86	154.38	155.3	153.3	147.05
32	138.39	133.57	137.86	141.02	140.35	144.07	144.07	146.99	145.37	145.18	138.48
34	139.5	140.19	140.89	140.71	139.22	146.24	146.24	146.58	146.11	145.68	139.34
36	143.21	142.66	142.42	145.22	144.71	147.97	147.97	151.9	150.87	150.35	141.32
68	126.12	124.85	126.32	129.48	131.04	131.86	131.86	133.49	134.5	132.19	128.65
40	137.74	135.88	135.59	136.84	137.6	140.77	140.77	142.45	144.29	142.84	136.35

Intermediate Exposure Group		Weight in grams							
Male Rats									
Animal	Quarantine -->		<-- Quarantine		Acclimation -->		<-- Acclimation		
ID	12-Apr-16	15-Apr-16	22-Apr-16	25-Apr-16	26-Apr-16	27-Apr-16	28-Apr-16	29-Apr-16	
41	117.7	133.72	166.79	175.81	181.26	181.31	186.24	190.54	
43	100.28	113.86	147.05	160.12	165.43	167.88	174.27	177.86	
45	110.64	127.68	164.76	179.91	184.77	190.72	193.54	194.98	
47	101.76	116.41	147.22	160.51	165.6	168.31	171.71	173.96	
49	111.35	128.82	170.47	180.14	184.96	188.98	192.75	194.38	
51	114.48	128.84	162.22	168.23	173	176.51	177.47	178.96	
53	113.25	126.36	158.8	171.17	174.9	176.62	182.98	185.27	
55	108.15	123.91	161.77	172.56	178.38	182.77	185.71	187.62	
57	106.88	121.73	157.5	167.52	174.65	176.81	177.93	181.46	
59	112.03	127.63	167.37	181.71	188.13	189.75	195.62	198.3	
Female Rats									
Animal	Quarantine -->		<-- Quarantine		Acclimation -->		<-- Acclimation		
ID	12-Apr-16	15-Apr-16	22-Apr-16	29-Apr-16	2-May-16	3-May-16	4-May-16	5-May-16	6-May-16
42	82.19	89.33	106.44	118.42	121.41	119.96	122.2	125.69	126.43
44	88.58	97.75	121.84	134.14	140.82	141.08	145.7	147.72	149.25
46	79.15	88.34	102.8	114.13	115.66	116.74	118.43	119.52	123.5
48	84.56	93.64	111.08	124.87	130.42	131.32	129.45	133.52	133.61
50	74.86	83.68	101.18	112.65	116.8	115.5	115.9	116.78	119.11
52	101	109.58	122.11	130.12	132.25	132.73	133.63	134.27	135.7
54	84.87	95.47	110.94	125.73	126.93	127.32	130.14	129.9	131.23
56	117.84	126.48	140.7	155.46	154.44	155.71	158.52	160.77	161.15
8	79.7	87.11	104.17	117.85	121.99	119.47	121.6	124.78	124.02
60	86.6	95.37	115.89	128.17	133.9	133.5	134.4	134.23	138.5

Intermediate Exposure Group		Weight in grams									
Male Rats											
Animal	Exposure -->		<-- Exposure								Necropsy
ID	1-May-16	2-May-16	3-May-16	4-May-16	5-May-16	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	13-May-16
41	195.9	198.35	198.1	202.74	201.28	208.95	209.31	212.63	212.96	212.32	201.59
43	183.6	190.09	191.79	197.05	197.58	204.83	210.26	212.54	215.1	214.51	202.8
45	200.82	204.15	205.83	208.32	208.36	216.08	221.42	223.64	228.23	225.63	212.09
47	179.86	182.84	183.1	186.17	187.8	196.21	197.89	201.26	203.06	201.28	188.63
49	201.07	203.32	205.41	208.92	207.66	214.66	218.27	219.99	220.36	219.96	209.95
51	183.54	184.58	185.81	187.53	188.2	197.64	199.39	200.55	205.09	204.39	192.6
53	192.27	194.43	197.49	197.87	201.8	215.46	215.5	216.96	221.37	221.82	210.02
55	194.94	199.35	199.01	200.07	203.42	213.33	214.64	216.34	220.9	220.48	206.82
57	187.69	190.8	192.31	192.42	192.99	202.73	205.27	208.58	208.93	210.41	198.44
59	206.78	207.3	211.58	213.51	215.8	224.88	230.15	230.71	236.4	236.96	226.1
Female Rats											
Animal	Exposure -->		<-- Exposure								Necropsy
ID	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	15-May-16	16-May-16	17-May-16	18-May-16	19-May-16	20-May-16
42	126.92	130.31	131.49	131.55	130.47	135.51	135.85	136.77	137.14	140.33	133.03
44	149.51	151.41	153.22	155.22	150.87	159.85	157.15	160.23	162.99	163.7	158.04
46	124.11	124.51	125.24	125.94	124.63	131.4	130.74	130.82	131.58	133.69	128.91
48	134.73	133.62	137.85	136.36	135.93	139.58	140.95	143.3	143.23	142.38	138.77
50	119.67	121.45	121.2	124.08	125.13	127.86	128.9	129.64	130.02	129.57	124.25
52	140.65	138.78	141	144.22	143.96	144.87	147.55	148.94	148.8	147.84	139.25
54	136.77	134.94	134.57	138.89	138.44	141.37	140.74	141.92	144.11	143.31	136.7
56	167.53	168.88	167.26	170.08	166.7	175.46	171.18	172.07	176.01	174.43	166.43
8	126.76	126.98	129.66	131.2	128.74	136.4	132.86	135.33	138.55	137.98	132.43
60	141.93	141.34	142.19	146.41	144.71	149.19	152.5	153.37	155.33	153.15	146.07

High Exposure Group		Weight in grams							
Male Rats									
Animal	Quarantine -->	<-- Quarantine Acclimation -->				<-- Acclimation			
ID	12-Apr-16	15-Apr-16	22-Apr-16	25-Apr-16	26-Apr-16	27-Apr-16	28-Apr-16	29-Apr-16	
61	108.82	123.12	161.61	176.64	182.31	185.58	189.81	192.47	
63	104.59	120.81	160.7	172.65	180.01	182.76	186.53	190.79	
65	103.13	117.48	152.33	163.53	167.71	170.73	175.98	180.35	
67	111.05	128.92	170.64	184.97	191.23	193.57	195.48	202.66	
7	102.54	118.07	149.49	162.06	165.1	170.24	173.76	176.8	
71	109.11	121.38	158.5	167.76	174.04	177.81	179.28	182.37	
31	88.66	105.67	138.82	150.91	155.77	161.98	164.1	169.03	
75	119.74	134.46	172.54	182.71	189.32	192.64	195.29	198.88	
77	115.51	131.42	168.85	177.72	182.28	183.91	188.45	190.42	
79	103.41	118.61	154.03	166.99	173.36	176.85	180.26	183.76	
Female Rats									
Animal	Quarantine -->	<-- Quarantine Acclimation -->				<-- Acclimation			
ID	12-Apr-16	15-Apr-16	22-Apr-16	29-Apr-16	2-May-16	3-May-16	4-May-16	5-May-16	6-May-16
62	74.5	81.71	98.39	109.76	113.21	113.48	115.22	118.06	119.77
64	88.24	97.42	117.05	128.36	130.58	131.84	132.31	134.31	135.38
66	104.22	113.82	130.25	141.88	142.84	143.66	146.24	146.01	148.21
38	81.96	91.65	107.85	121.22	123.1	124.15	126.46	126.78	128.81
70	102.04	111.51	129.17	141.48	144.17	145.16	146.94	148.49	149.85
72	76.29	85.76	102.38	116.18	119.07	120.89	123.54	123.52	123.92
74	88.45	99.4	119.29	133.78	134.06	135.35	137.91	138.93	137.41
76	78.11	87	106.17	119.68	122.19	116.47	125.37	125.9	128.31
78	84.77	93.4	112.65	124.45	129.53	128.21	128.1	130.07	133.05
80	90.66	100.45	117.54	127.86	130.44	130.86	134.02	134.67	137.4

High Exposure Group		Weight in grams									
Male Rats											
Animal	Exposure -->	<-- Exposure Necropsy									
ID	1-May-16	2-May-16	3-May-16	4-May-16	5-May-16	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	13-May-16
61	195.7	197.89	200.04	202.71	204.32	209.99	213.79	216.7	217.34	217.9	203.67
63	196.61	196.62	199.85	202.17	202.47	213.51	214.31	216.13	221.03	219.7	206.59
65	184.24	185.98	187.41	189.12	192.48	197.02	202.72	203.09	206.72	208.34	198.42
67	209.66	211.34	214.73	216.32	217.35	231.17	232.59	235.01	237.25	237.96	225.88
7	182.39	182.28	186.99	186.49	190.32	199.34	199.74	202.45	202.5	205.55	194.93
71	190.08	193.21	193.47	195.11	197.91	209.66	210.32	213.23	215.78	215.44	202.71
31	176.81	181.15	183.78	184.66	189.16	201.21	202.69	207.29	208.68	212.2	200.1
75	204.34	203.96	208.19	210.26	211.64	219.05	220.44	222.38	227.3	224.75	211.94
77	194.22	197.24	197.32	198.86	201.43	210.38	211.7	214.16	215.03	215.55	203.99
79	189	191.35	193.61	194.25	195.12	207.31	206.96	212.28	213.97	214	203.75
Female Rats											
Animal	Exposure -->	<-- Exposure Necropsy									
ID	8-May-16	9-May-16	10-May-16	11-May-16	12-May-16	15-May-16	16-May-16	17-May-16	18-May-16	19-May-16	20-May-16
62	122.13	124.3	124.04	124.32	124.09	128.34	128.81	129.01	130.31	130.82	125.48
64	138.07	135.62	136.66	135.27	137.03	139.27	142.86	140.34	143.05	140.08	132.19
66	151.02	148.38	151.79	149.87	149.88	155.49	157.8	157.7	159.34	159.97	152.12
38	132.71	131.66	121.63	128.29	131.01	137.39	136.62	137.25	138.5	138.42	132.15
70	150.46	150.74	152.91	154.61	154.23	157.76	158.96	158.52	161.84	161.67	153.79
72	128.58	127.27	124.46	128.28	124.77	131.18	131.86	132.2	132.84	133.52	127.68
74	140.63	142.46	139.8	139.66	139.03	143.63	144.51	145.18	148.65	147.78	140.67
76	131.51	133.2	134.75	133.85	135.88	138.79	139.06	140.17	140.77	140.69	134.4
78	137.35	136.38	132.63	135.98	135.81	138.41	139.36	143.12	142.28	141.9	134.29
80	137.91	138.72	138.55	139.41	139.28	144.62	144.88	144.99	147.91	146.03	139.57

## Male Water Consumption Measurements for PAO Acute Exposure Study

Animal ID	Date Group	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May
		Acclimation -->		<-- Acclimation		Pre-Exposure		
		1	2	3	4	5		-1
1	Control	16.63	16.69	23.87	24.51	25.16		27.37
3	Control	27.53	DNR	27.59	31.84	30.03		29.06
5	Control	18.85	17.75	26.14	26.78	26.12		29.13
69	Control	20.05	21.38	30.78	20.83	22.59		23.93
9	Control	18.65	17.77	26.29	21.87	23.48		27.01
11	Control	17.56	18.97	28.40	26.69	29.15		31.30
13	Control	21.05	22.81	29.31	29.87	28.83		30.97
15	Control	20.80	20.02	29.29	26.76	29.95		31.59
17	Control	17.34	19.29	27.91	23.95	21.64		27.38
19	Control	17.08	16.95	24.04	27.01	23.96		25.89
21	Low	18.77	18.40	32.50	29.95	29.55		19.25
23	Low	20.41	19.59	26.95	27.08	27.12		36.29
25	Low	25.37	26.15	33.06	34.16	30.98		46.46
27	Low	13.78	14.53	22.27	DNR	22.11		55.42
29	Low	21.41	21.46	DNR	20.22	21.96		22.80
73	Low	25.15	23.85	22.08	21.62	36.63		24.94
33	Low	24.81	23.81	30.78	30.54	DNR		36.77
35	Low	19.79	22.63	30.47	32.91	33.07		37.24
37	Low	24.14	24.80	25.35	26.72	25.73		30.78
39	Low	16.90	19.55	25.35	26.26	23.24		35.81
41	Intermediate	18.09	17.29	20.01	22.26	20.86		22.60
43	Intermediate	18.84	17.28	DNR	21.23	19.50		24.29
45	Intermediate	21.78	19.76	25.31	21.99	20.52		25.67
47	Intermediate	18.83	18.72	18.60	17.51	16.90		19.20
49	Intermediate	23.49	22.85	22.40	22.16	20.33		24.85
51	Intermediate	22.61	DNR	25.37	25.04	20.93		23.71
53	Intermediate	21.19	22.01	DNR	21.02	18.71		19.68
55	Intermediate	22.10	23.91	23.24	20.71	23.68		20.76
57	Intermediate	20.56	21.02	31.09	20.03	41.18		22.59
59	Intermediate	19.35	22.91	18.36	19.57	36.44		21.38
61	High	20.13	22.26	21.61	20.14	19.63		21.75
63	High	23.55	40.29	23.11	22.90	20.64		23.42
65	High	20.86	20.86	37.26	DNR	DNR		37.02
67	High	20.67	21.51	21.63	22.08	21.24		20.58
7	High	17.17	16.19	27.88	27.72	29.76		40.73
71	High	22.15	30.12	25.38	22.22	21.46		24.51
31	High	18.30	18.30	26.49	24.39	26.58		30.79
75	High	23.92	31.58	20.82	19.27	18.60		20.26
77	High	25.02	23.10	21.77	20.74	19.54		20.40
79	High	23.63	31.64	20.78	20.82	19.55		20.76
		Weight in grams		DNR=data not recorded				

	2-May	3-May	4-May	5-May	6-May	7-May	8-May	9-May	10-May	11-May	12-May	13-May
Animal	Exposure -->										<-- Exposure	
ID	1	2	3	4	5		7	8	9	10	11	12
1	30.68	44.53	25.04	24.94	DNR		22.17	30.97	24.24	26.80	21.22	12.67
3	29.56	36.33	25.87	21.53	21.09		22.37	21.13	19.88	32.83	49.33	43.48
5	31.93	22.82	20.65	18.98	18.65		18.57	18.04	18.16	27.92	18.51	13.39
69	43.84	22.07	22.76	20.45	23.94		21.49	21.66	19.70	29.40	21.61	15.29
9	24.67	31.60	24.20	13.80	11.17		16.46	18.12	21.00	25.60	19.12	15.09
11	34.57	23.62	25.74	19.42	17.61		17.53	18.72	18.16	22.91	17.35	13.27
13	36.49	25.31	24.60	21.50	25.27		21.94	24.42	23.09	29.70	40.40	41.04
15	43.72	23.79	20.95	24.04	20.22		21.63	22.57	21.97	28.97	39.71	37.43
17	27.25	38.30	26.57	21.35	22.76		23.07	23.36	20.52	22.93	16.88	12.20
19	26.70	39.72	22.68	19.16	20.30		19.67	17.10	19.13	30.51	35.97	34.18
21	17.36	15.84	24.83	39.54	DNR		19.66	19.75	20.79	23.12	18.74	14.35
23	28.27	25.65	31.99	20.33	20.57		20.39	20.75	23.84	22.21	21.11	11.32
25	31.84	26.60	25.71	21.90	23.22		21.32	22.25	25.94	38.32	44.36	44.41
27	26.08	17.99	18.75	15.45	16.45		16.47	14.15	16.31	26.72	39.49	32.27
29	22.29	17.28	27.42	21.37	21.73		23.18	22.98	24.84	35.89	48.73	47.50
73	20.41	19.80	29.77	23.17	25.28		25.07	22.11	26.27	33.69	38.64	40.50
33	26.93	25.83	DNR	23.98	22.75		22.75	24.52	24.82	26.62	21.29	14.19
35	30.11	28.34	26.88	22.09	23.21		22.18	22.66	23.46	23.27	19.67	12.83
37	23.09	22.76	26.32	21.09	19.81		19.68	20.30	19.39	24.94	18.58	12.33
39	25.22	22.97	27.80	22.48	21.87		23.26	17.91	19.99	26.43	17.15	12.62
41	22.27	20.53	26.34	18.58	19.30		19.71	19.09	19.08	26.31	20.88	12.39
43	31.87	20.56	23.60	18.62	20.30		20.26	19.44	22.01	25.04	17.87	13.98
45	27.76	24.12	24.05	20.54	20.85		20.45	21.93	21.67	33.34	36.44	27.11
47	17.62	18.49	23.00	20.14	21.66		20.76	18.69	22.18	24.73	19.65	10.97
49	25.53	24.92	21.63	18.76	18.15		19.20	19.73	19.24	23.59	19.65	13.12
51	23.66	21.35	23.82	17.74	18.83		20.02	18.78	18.70	23.70	19.57	13.42
53	19.27	22.10	21.86	18.39	17.89		20.78	17.48	20.62	31.89	38.08	29.98
55	19.95	17.35	21.87	18.64	18.18		17.65	15.86	17.06	31.13	35.87	22.46
57	20.99	20.82	21.42	18.63	21.80		18.18	18.69	20.81	30.22	39.46	30.86
59	19.87	22.64	23.42	20.44	21.41		19.35	20.40	19.75	29.16	22.60	16.22
61	21.71	19.86	21.66	18.29	17.17		18.28	16.90	17.82	23.28	21.49	12.77
63	18.54	19.77	25.64	18.68	20.61		20.62	17.85	18.83	23.32	18.71	10.97
65	24.87	25.33	23.81	20.24	19.19		19.23	21.34	19.50	25.22	22.40	20.08
67	19.05	19.98	24.80	21.54	20.73		21.05	19.60	20.72	DNR	DNR	DNR
7	24.42	23.52	20.23	17.31	15.71		19.66	14.69	19.02	22.79	25.31	19.05
71	21.61	19.46	24.77	18.80	20.22		20.99	17.68	20.92	24.22	20.86	11.75
31	27.04	DNR	20.59	18.75	20.55		19.57	17.23	20.19	25.74	23.26	15.73
75	18.48	21.62	22.91	19.70	19.14		18.79	17.88	20.66	27.05	23.78	13.57
77	20.67	20.89	25.82	22.96	22.62		22.69	19.79	22.19	27.34	24.17	16.19
79	22.00	21.19	21.64	17.47	18.38		19.54	16.56	19.95	24.78	21.30	16.22
Weight in grams      DNR=data not recorded												

## Female Water Consumption Measurements for PAO Acute Exposure Study

Animal ID	Date	2-May	3-May	4-May	5-May	6-May	7-May	8-May
	Group	Acclimation --> 1	2	3	<-- Acclimation 4	5		Pre-Exposure -1
2	Control	15.72	19.74	21.58	17.49	19.61		21.18
4	Control	16.22	15.07	17.22	18.23	14.22		17.77
6	Control	16.38	17.99	17.91	15.59	15.56		16.09
28	Control	15.96	14.32	25.01	14.24	13.02		14.12
10	Control	28.12	DNR	19.19	14.73	14.01		14.39
12	Control	15.16	15.44	17.91	14.39	15.88		16.12
14	Control	24.01	20.43	18.39	17.70	15.77		19.98
16	Control	12.75	14.38	16.63	14.50	14.93		14.09
18	Control	19.88	18.85	21.75	19.30	21.39		18.93
20	Control	17.22	18.69	19.63	16.75	17.37		16.45
22	Low	16.74	16.23	33.22	22.99	19.99		17.71
24	Low	18.07	22.09	17.26	17.28	15.45		17.23
26	Low	34.47	26.49	DNR	DNR	17.06		16.34
58	Low	26.02	21.80	18.46	15.75	14.42		16.69
30	Low	25.41	21.88	22.88	20.16	16.63		20.81
32	Low	22.89	24.90	23.27	21.93	21.85		19.86
34	Low	15.09	16.56	22.50	16.06	14.82		14.97
36	Low	17.57	0.00	20.39	17.24	16.69		17.60
68	Low	14.01	12.71	18.46	14.90	13.92		14.37
40	Low	17.03	18.87	20.00	14.46	17.75		16.34
42	Intermediate	18.94	15.17	17.60	15.66	13.67		15.50
44	Intermediate	18.51	16.80	20.31	15.65	14.28		14.12
46	Intermediate	DNR	15.33	13.00	11.37	12.77		12.52
48	Intermediate	14.34	17.55	18.59	19.22	14.33		17.80
50	Intermediate	17.31	14.86	19.97	15.70	13.51		14.67
52	Intermediate	24.80	DNR	20.11	18.22	18.28		16.96
54	Intermediate	15.69	15.84	DNR	21.63	18.45		19.24
56	Intermediate	25.03	22.66	25.99	19.57	16.71		21.13
8	Intermediate	16.23	15.56	15.68	15.38	11.22		15.14
60	Intermediate	18.02	16.45	19.31	16.67	19.13		18.16
62	High	14.77	16.43	18.77	13.89	12.48		14.01
64	High	36.44	19.00	20.86	17.90	17.81		18.72
66	High	16.31	14.76	22.14	19.34	17.11		19.17
38	High	29.41	16.41	18.14	13.44	16.57		16.77
70	High	14.91	13.98	21.08	18.44	16.26		17.03
72	High	13.96	14.08	16.20	11.71	12.70		14.76
74	High	16.42	17.05	20.18	16.51	13.88		17.47
76	High	26.60	DNR	24.24	14.44	15.14		16.48
78	High	15.60	12.76	19.99	17.61	15.89		17.40
80	High	29.48	DNR	23.32	17.42	17.60		15.52
		Weight in grams			DNR=data not recorded			

	9-May	10-May	11-May	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May
Animal ID	Exposure -->										<-- Exposure	
	1	2	3	4	5	7	8	9	10	11	12	
2	21.39	17.22	30.45	20.95	22.08		20.00	22.92	26.01	21.48	18.23	18.39
4	14.90	17.27	24.48	13.57	16.81		16.23	17.44	16.54	24.87	15.87	14.79
6	16.91	17.32	24.67	13.03	15.06		15.99	15.88	15.93	20.70	16.95	12.33
28	14.79	17.18	22.44	12.33	13.83		15.24	12.45	13.80	30.58	DNR	DNR
10	17.03	16.28	21.38	11.64	15.28		16.38	14.01	13.90	19.44	17.66	9.96
12	14.68	15.31	24.99	12.89	14.24		14.60	15.35	15.43	27.31	14.45	15.43
14	19.85	15.44	24.03	16.79	17.67		18.06	17.58	18.79	25.96	18.14	10.26
16	16.90	12.18	20.68	10.74	13.00		11.62	17.65	13.57	20.19	15.40	14.12
18	20.40	19.48	28.72	23.82	22.03		21.03	27.03	22.30	23.14	17.70	17.07
20	16.78	17.24	24.14	13.35	12.94		15.43	13.40	14.28	21.18	16.48	13.33
22	13.63	16.77	37.12	27.44	22.76		20.36	26.15	27.43	22.68	17.75	17.57
24	13.18	16.57	24.53	15.73	19.08		18.20	15.87	17.44	22.10	18.37	13.19
26	20.36	16.93	20.17	13.95	16.40		16.02	16.91	17.65	25.53	18.77	14.03
58	15.65	14.03	37.82	24.49	27.49		19.89	22.11	24.56	20.21	16.91	12.34
30	17.26	17.77	20.55	15.36	17.00		16.61	12.41	20.10	22.40	18.08	11.43
32	21.25	25.89	28.43	19.64	20.09		18.78	23.91	20.88	21.57	19.72	16.16
34	15.73	14.88	17.79	14.42	16.64		16.12	12.08	18.17	21.77	15.47	11.64
36	15.31	16.44	22.05	13.57	14.65		14.36	15.44	16.15	19.82	17.14	22.03
68	11.91	18.19	21.45	14.76	11.65		14.35	13.58	15.66	15.35	11.38	16.20
40	12.88	14.38	21.54	15.28	18.17		13.99	15.02	18.39	22.71	13.85	12.89
42	15.57	15.89	20.08	12.98	17.20		15.55	17.20	16.67	27.66	23.51	18.59
44	15.79	17.34	23.40	12.48	18.27		15.97	13.32	17.07	23.27	18.93	15.34
46	11.94	12.41	24.50	17.42	21.88		16.38	20.23	16.34	21.80	14.48	12.16
48	14.42	16.26	24.57	19.83	22.58		16.31	19.39	18.91	21.88	14.69	15.20
50	13.02	17.18	27.76	22.81	20.96		18.83	25.13	21.32	22.94	14.84	12.65
52	13.72	16.48	23.10	17.15	15.00		14.74	16.90	18.00	19.21	13.26	9.43
54	15.26	15.92	31.69	25.88	27.63		21.69	27.47	23.12	25.27	18.86	15.83
56	20.65	15.73	24.86	16.27	19.00		19.85	14.85	19.76	27.23	19.79	13.54
8	13.80	15.24	26.27	22.20	26.09		18.38	23.41	22.07	DNR	17.73	17.67
60	15.00	17.68	31.13	21.56	24.49		20.86	27.76	24.44	22.42	18.24	16.97
62	12.30	14.61	DNR	23.38	23.03		18.58	23.77	22.23	24.85	16.68	16.57
64	12.81	18.60	19.85	17.87	15.57		16.01	18.37	18.24	24.08	14.35	15.59
66	14.24	20.39	22.62	17.62	20.28		17.42	20.08	20.95	23.94	16.62	15.19
38	11.16	4.54	24.99	17.40	18.41		16.85	17.26	17.77	21.41	15.92	15.74
70	15.76	17.49	DNR	21.18	18.86		18.44	20.27	20.12	21.32	15.94	11.88
72	10.29	10.97	21.98	12.02	14.13		15.25	15.11	14.39	19.05	15.76	13.51
74	15.69	12.03	DNR	18.52	18.96		17.96	15.22	18.05	23.97	19.19	16.21
76	15.49	15.37	20.60	17.79	17.41		18.37	17.80	17.28	21.30	17.60	14.03
78	14.66	12.61	21.22	13.96	16.23		15.24	16.68	18.97	23.11	19.06	18.33
80	16.26	15.02	19.91	16.71	21.22		17.37	17.45	17.33	22.58	17.82	15.85
Weight in grams												
DNR=data not recorded												

## Male Food Consumption Measurements for PAO Acute Exposure Study

Animal ID	Group	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
		Acclimation -->			<-- Acclimation			Pre-Exposure
		1	2	3	4	5		-1
1	Control	13.81	13.26	13.98	14.23	13.73		14.49
3	Control	16.21	13.75	16.8	17.07	15.62		16.18
5	Control	15.91	13.8	12.14	14.67	13.13		14.97
69	Control	16.91	14.66	15.5	14.83	16.25		16.24
9	Control	14.76	12.23	14.47	12.47	13.53		13.23
11	Control	12.52	10.59	13.19	12.65	12.62		12.80
13	Control	15.99	13.72	14.94	14.04	13.27		14.14
15	Control	15.07	12.98	13.89	13.83	13.72		14.50
17	Control	15.12	11.65	14.15	13.35	13.33		14.87
19	Control	13.33	11.34	12.3	13.82	11.94		13.30
21	Low	14.48	12.05	13.51	13.92	10.84		14.49
23	Low	14.21	12.19	14.66	15.83	12.6		15.20
25	Low	17.74	15.16	14.96	16.68	16.07		14.93
27	Low	10.95	9.04	12.6	DNR	9.38		10.78
29	Low	15.64	13.26	13.63	13.05	14.83		13.01
73	Low	15.41	14.57	15.16	14.81	12.88		14.27
33	Low	17.16	13.19	15.79	15.75	DNR		16.33
35	Low	15.22	11.96	14.33	13.11	15.53		13.97
37	Low	15.39	13.12	13.1	14.74	14.24		13.40
39	Low	14.78	11.78	14.18	14.17	12.34		13.41
41	Intermediate	15.31	12.57	13.1	14.67	14.27		13.0
43	Intermediate	13.79	11.52	14.33	14.95	14.14		13.9
45	Intermediate	16.86	13.37	16.47	15.35	13.09		13.6
47	Intermediate	13.63	12.54	13.01	13.97	12.57		12.8
49	Intermediate	16.50	14.36	14.6	14.95	13.63		14.5
51	Intermediate	12.61	13.07	13.73	12.36	12.48		12.7
53	Intermediate	16.04	11.43	12.64	13.81	12.94		13.0
55	Intermediate	14.03	12.97	14.51	13.41	13.57		14.5
57	Intermediate	14.30	12.18	13.19	13.6	12.88		DNR
59	Intermediate	15.42	11.97	12.68	17.38	14.72		16.0
61	High	16.25	13.52	14.28	15.03	13.47		13.59
63	High	14.39	14.29	15.01	14.48	14.19		14.46
65	High	15.79	12.61	14.17	14.2	15.13		14.55
67	High	15.13	14.24	13.47	15.88	14.81		15.53
7	High	13.66	11.24	13.01	13.2	13.65		13.35
71	High	13.53	12.99	14.75	12.65	13.91		14.80
31	High	13.87	11.99	13.97	12.58	12.58		13.69
75	High	14.13	13.59	15.84	13.64	14.91		14.07
77	High	15.80	12.6	14.75	15.11	14.42		13.83
79	High	13.43	13.51	13.6	14.37	13.54		13.50
		Weight in grams		DNR=data not recorded				



Animal	Mon Exposure -->	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri <-- Exposure
ID	1	2	3	4	5			8	9	10	11	12
1	12.73	15.24	15.54	15.97	13.96		15.17	15.36	14.51	15.70	15.35	2.27
3	15.92	17.04	18.95	16.86	14.70		17.79	15.57	14.56	15.17	14.97	4.51
5	13.52	14.85	14.42	15.30	13.24		15.14	13.04	12.04	15.23	12.35	2.32
69	15.61	16.43	19.50	15.49	18.20		17.30	15.60	15.81	16.72	16.31	3.35
9	13.32	15.46	16.94	14.59	12.11		13.33	12.04	14.18	13.96	12.29	3.86
11	12.47	13.52	15.21	14.17	12.12		13.04	12.16	11.65	13.27	10.55	2.43
13	13.73	14.20	15.30	14.95	15.55		14.09	14.74	12.40	14.06	14.68	2.69
15	14.33	15.21	15.63	18.18	12.53		15.60	12.13	13.00	15.07	15.01	2.77
17	12.71	16.31	17.11	16.14	14.74		15.50	13.38	11.32	14.78	12.58	2.45
19	12.66	14.87	17.61	16.19	15.28		14.48	13.63	14.11	14.80	13.77	2.66
21	13.72	14.19	14.74	13.70	13.53		12.71	13.40	10.96	12.21	12.95	3.12
23	13.20	16.30	17.62	15.18	12.91		15.65	13.86	13.83	13.93	12.81	2.68
25	15.89	15.82	16.60	17.17	16.90		15.30	14.42	13.26	15.91	13.55	3.34
27	11.33	12.35	12.71	13.37	13.63		11.50	11.09	11.81	12.44	11.57	3.25
29	13.00	14.76	15.39	15.80	13.13		14.78	14.21	12.22	16.28	12.98	2.83
73	14.06	16.08	14.89	15.23	14.74		16.44	12.88	14.36	15.67	11.53	3.88
33	13.53	15.99	16.65	18.47	15.52		15.43	15.03	15.73	16.23	13.37	4.19
35	16.10	13.96	16.77	15.15	14.10		16.01	13.37	16.57	13.30	14.12	2.89
37	13.31	14.92	16.64	14.28	14.28		13.63	12.05	12.72	14.02	12.43	2.00
39	12.65	14.09	14.68	15.81	12.89		15.33	12.34	10.26	15.04	13.52	1.96
41	13.7	14.2	17.6	14.4	12.1		14.23	10.29	13.82	12.61	11.09	3.10
43	13.8	15.7	17.2	15.0	13.8		14.47	14.10	13.48	14.34	14.32	2.07
45	13.8	15.9	16.6	14.6	13.9		14.67	14.72	12.74	15.50	12.99	2.16
47	10.8	13.4	14.9	14.0	12.0		13.89	12.29	11.73	13.38	11.47	2.10
49	11.8	18.1	16.8	13.9	14.2		14.20	13.29	13.62	13.36	12.75	2.32
51	10.6	15.2	14.7	14.1	13.3		13.22	12.17	11.11	14.77	13.97	1.57
53	13.5	16.1	15.7	16.1	13.9		16.45	12.74	11.82	14.97	14.10	3.45
55	14.2	13.5	15.7	17.5	13.2		14.81	12.66	12.24	15.04	13.02	2.36
57	13.3	15.9	15.6	13.5	15.6		13.22	13.46	12.67	13.00	13.12	2.40
59	14.3	17.4	18.7	16.2	16.6		16.19	16.60	14.08	18.91	15.71	3.31
61	11.75	15.13	17.08	16.52	12.54		14.67	11.98	12.02	13.92	12.50	2.54
63	12.26	15.57	17.91	15.42	13.71		16.55	12.91	12.50	15.49	13.76	2.93
65	12.21	13.45	15.73	15.40	14.41		13.57	15.64	12.69	16.12	13.91	3.44
67	13.70	17.29	18.02	17.74	14.55		17.48	13.28	15.70	13.13	16.76	2.32
7	10.97	14.73	15.51	14.29	12.22		15.22	11.56	10.80	11.94	13.53	2.01
71	12.90	14.10	15.15	15.40	13.28		15.89	11.79	13.33	13.79	13.17	3.14
31	14.40	14.72	15.13	15.15	14.99		15.36	12.76	13.94	13.90	15.62	3.20
75	11.71	15.93	17.75	16.30	13.51		15.16	13.27	13.62	16.44	13.96	1.66
77	12.43	13.73	16.03	14.88	14.93		14.59	13.53	14.26	13.77	14.68	1.06
79	13.22	15.56	15.03	13.41	13.46		14.95	11.83	14.06	13.06	13.73	1.87
Weight in grams				DNR=data not recorded								

## Female Food Consumption Measurements for PAO Acute Exposure Study

Animal		Mon	Tues	Wed	Thurs	Fri	Sat	Sun
ID	Group	Acclimation --> 1	2	3	<-- Acclimation 4	5		Pre-Exposure -1
2	Control	9.10	9.43	10.02	8.86	10.02		9.93
4	Control	10.13	10.12	10.50	11.53	9.84		11.56
6	Control	9.57	11.52	11.39	10.69	8.12		11.14
28	Control	9.97	8.16	9.01	10.11	8.31		9.06
10	Control	8.36	9.15	11.52	10.65	9.99		10.25
12	Control	9.99	9.73	10.83	10.91	9.20		11.10
14	Control	10.07	11.56	11.22	11.67	8.39		11.31
16	Control	7.75	9.10	8.91	9.28	7.78		8.28
18	Control	11.09	10.09	12.08	9.98	10.57		10.67
20	Control	8.59	9.61	11.00	9.84	9.28		9.94
22	Low	9.88	9.19	10.06	9.35	9.13		10.87
24	Low	8.91	9.97	10.23	11.12	9.06		10.49
26	Low	10.15	9.06	11.54	11.35	10.16		9.46
58	Low	8.80	10.81	10.78	10.55	8.69		10.29
30	Low	9.85	10.65	10.03	11.49	9.43		10.74
32	Low	9.52	9.20	10.10	11.41	8.93		10.98
34	Low	10.39	10.09	11.40	11.17	9.81		9.73
36	Low	9.83	9.34	9.89	10.68	9.27		11.05
68	Low	8.50	8.85	9.99	10.31	7.36		10.03
40	Low	9.22	8.13	11.52	10.57	10.33		9.77
42	Intermediate	9.47	7.92	9.63	10.62	8.51		10.23
44	Intermediate	9.75	9.49	11.82	10.58	14.09		10.98
46	Intermediate	8.80	9.51	9.52	10.49	10.49		9.20
48	Intermediate	8.93	9.37	8.84	11.58	8.01		9.44
50	Intermediate	7.98	9.34	8.16	10.36	8.47		9.46
52	Intermediate	8.22	8.63	9.79	10.89	7.68		11.32
54	Intermediate	8.96	9.74	11.54	10.29	10.05		10.99
56	Intermediate	9.18	10.63	12.07	11.76	9.07		12.02
8	Intermediate	6.37	9.30	9.38	11.05	7.17		10.08
60	Intermediate	9.02	10.47	10.76	10.77	9.02		11.31
62	High	9.22	7.70	10.10	10.50	8.17		10.64
64	High	8.34	10.61	11.11	10.74	8.91		11.98
66	High	8.20	10.61	11.11	10.32	7.99		10.52
38	High	9.37	10.83	11.13	8.96	10.15		10.66
70	High	9.75	10.02	11.46	10.68	8.59		9.76
72	High	8.71	10.40	12.10	9.79	10.10		9.98
74	High	9.35	11.29	12.35	11.41	7.63		10.20
76	High	8.82	5.61	13.01	10.33	10.68		10.19
78	High	10.30	9.31	9.84	11.95	9.86		10.28
80	High	8.47	10.57	10.95	10.84	10.16		9.63
		Weight in grams		DNR=data not recorded				

Animal	Mon Exposure -->	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri <-- Exposure
ID	1	2	3	4	5		7	8	9	10	11	12
2	7.77	7.69	10.45	7.24	8.86		10.29	11.21	9.80	8.12	9.93	5.22
4	9.45	DNR	DNR	8.95	10.47		11.45	11.76	10.69	9.74	9.39	5.41
6	9.03	10.09	11.85	8.82	10.04		11.88	11.05	11.04	8.18	10.39	4.41
28	7.50	7.59	10.54	7.27	7.29		10.67	9.33	7.67	9.51	9.41	4.17
10	9.82	8.29	11.67	6.75	10.35		10.60	11.45	8.79	7.93	9.04	4.06
12	8.64	7.65	11.91	8.05	8.93		11.60	11.45	9.78	11.07	7.98	5.50
14	11.11	7.38	10.03	10.95	8.11		11.29	14.38	11.18	9.30	11.08	2.93
16	8.16	7.10	10.73	7.22	8.93		8.91	10.83	9.53	8.79	9.24	3.04
18	9.58	8.90	13.88	9.00	9.73		11.97	14.05	10.09	10.73	10.39	5.60
20	7.87	8.61	10.50	8.82	8.82		10.45	8.73	10.00	7.66	8.64	4.21
22	7.32	7.81	10.34	10.09	8.61		11.28	12.17	10.22	8.57	9.42	4.87
24	6.68	7.25	10.32	7.12	9.55		11.37	10.13	9.51	8.73	9.77	3.51
26	10.00	8.38	10.36	9.29	9.75		11.41	13.15	9.10	9.69	10.15	4.08
58	8.35	6.47	9.56	7.55	10.29		11.25	9.67	10.63	11.33	9.78	4.22
30	8.45	9.59	9.23	9.61	10.32		10.71	9.26	10.47	8.86	9.81	3.29
32	5.28	8.12	11.60	8.43	8.16		10.34	12.72	10.89	8.15	10.41	3.43
34	9.80	7.76	8.35	8.03	10.30		10.76	9.64	9.96	8.95	6.76	3.89
36	7.82	8.89	9.65	9.23	8.84		11.25	10.87	11.36	8.79	7.91	2.91
68	7.64	8.25	10.12	9.25	7.58		10.23	10.35	10.09	8.12	8.21	4.70
40	8.61	8.12	9.20	9.16	9.31		10.39	9.85	10.24	9.73	9.46	4.86
42	8.69	7.32	9.81	7.77	10.47		9.45	10.12	9.93	9.41	10.60	3.68
44	8.17	10.39	11.32	8.24	11.40		12.51	10.44	12.61	11.36	11.46	5.75
46	8.19	7.02	8.04	7.23	8.64		10.40	8.00	10.85	8.45	9.88	3.64
48	6.75	8.48	7.34	8.03	9.02		9.00	10.66	11.47	7.51	8.61	5.50
50	7.89	7.82	8.84	9.42	8.52		9.93	10.07	9.89	8.69	9.56	3.72
52	6.93	8.42	10.77	8.88	10.14		10.39	12.10	10.90	9.25	9.83	2.82
54	7.33	7.37	10.65	7.97	8.86		11.73	10.29	9.80	9.84	9.65	3.45
56	10.57	8.47	11.00	8.93	10.26		12.86	9.43	11.14	11.57	10.71	3.96
8	8.05	8.27	8.86	7.63	9.05		10.59	9.81	9.42	9.81	8.83	4.93
60	8.25	8.04	9.97	9.35	11.00		10.83	11.75	12.27	9.91	8.28	4.00
62	8.79	5.86	9.17	6.92	9.82		10.01	10.91	10.23	7.76	9.59	4.39
64	5.11	7.16	7.14	9.38	8.53		10.97	11.48	9.31	8.48	7.09	3.64
66	6.97	6.95	DNR	DNR	11.06		10.76	10.99	10.74	9.68	9.87	4.33
38	6.44	1.51	13.30	5.13	9.22		10.41	10.95	10.57	7.80	8.90	3.24
70	7.94	7.68	9.36	9.53	10.12		10.84	10.87	10.51	10.09	9.38	4.01
72	7.37	5.96	9.33	5.82	7.68		10.33	10.80	10.49	8.48	9.22	5.49
74	10.25	6.30	6.74	8.51	9.28		11.24	9.92	11.45	10.47	9.40	4.11
76	9.30	9.83	8.44	8.98	8.20		10.93	11.23	10.88	8.15	10.28	3.84
78	7.48	5.65	8.54	7.79	9.00		10.36	10.86	11.24	8.26	8.98	2.10
80	7.92	7.74	9.31	7.63	10.36		10.77	11.97	8.85	9.36	8.80	4.33
Weight in grams				DNR=data not recorded								

## APPENDIX L. REPEATED EXPOSURE STUDY NECROPSY WEIGHT DATA

### Male and Female Necropsy Weight Data

#### Control Exposure Group

Animal ID	Sex	Final Weight (g)	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
1	Male	198.24	1.720	0.749	0.813	0.043	7.570
2	Female	140.06	1.710	0.525	0.537	0.050	4.393
3	Male	234.19	1.840	0.867	0.803	0.056	7.435
4	Female	150.99	1.740	0.625	0.658	0.063	4.567
5	Male	205.51	1.790	0.770	0.779	0.045	6.474
6	Female	154.95	1.770	0.585	0.577	0.048	4.696
69	Male	237.91	1.860	0.782	0.766	0.047	7.265
28	Female	133.5	1.720	0.547	0.533	0.049	4.122
9	Male	199.4	1.800	0.740	0.705	0.047	6.760
10	Female	140.99	1.710	0.509	0.513	0.054	4.049
11	Male	190.7	1.760	0.769	0.658	0.042	6.504
12	Female	137.88	1.750	0.564	0.527	0.055	4.840
13	Male	216.09	1.830	0.766	0.809	0.055	6.528
14	Female	153.1	1.700	0.556	0.568	0.069	4.378
15	Male	208.51	1.780	0.822	0.802	0.060	7.756
16	Female	125.08	1.620	0.456	0.465	0.043	3.691
17	Male	205.04	1.790	0.813	0.847	0.054	6.871
18	Female	152.32	1.680	0.570	0.603	0.054	4.974
19	Male	204.13	1.830	0.754	0.691	0.042	6.819
20	Female	126.67	1.640	0.494	0.446	0.048	3.621
Mean		175.76	1.752	0.663	0.655	0.051	5.666
SD		37.42	0.066	0.130	0.130	0.007	1.441
SEM		8.37	0.015	0.029	0.029	0.002	0.322
<b>Male Statistics</b>							
Mean		209.97	1.800	0.783	0.767	0.049	6.998
SD		15.30	0.042	0.039	0.062	0.007	0.472
SEM		4.84	0.013	0.012	0.020	0.002	0.149
<b>Female Statistics</b>							
Mean		141.55	1.704	0.543	0.543	0.053	4.333
SD		11.01	0.047	0.049	0.063	0.008	0.460
SEM		3.48	0.015	0.015	0.020	0.002	0.145

### Low Exposure Group

Animal ID	Sex	Final Weight (g)	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
21	Male	189.85	1.800	0.759	0.781	0.046	6.130
22	Female	140.57	1.740	0.594	0.567	0.056	4.513
23	Male	196.58	1.790	0.801	0.798	0.045	6.757
24	Female	130.69	1.690	0.539	0.508	0.050	4.509
25	Male	226.8	1.860	0.850	0.855	0.047	7.225
26	Female	139.99	1.680	0.534	0.512	0.041	4.259
27	Male	175.23	1.710	0.676	0.660	0.049	5.674
58	Female	149.31	1.730	0.549	0.567	0.048	4.280
29	Male	215.43	1.800	0.814	0.823	0.051	7.952
30	Female	147.05	1.700	0.541	0.533	0.045	4.188
73	Male	221.89	1.770	0.805	0.813	0.052	8.731
32	Female	138.48	1.690	0.556	0.513	0.055	4.106
33	Male	228.94	1.840	0.830	0.755	0.059	7.994
34	Female	139.34	1.820	0.537	0.515	0.047	3.858
35	Male	205.47	1.770	0.760	0.740	0.040	6.809
36	Female	141.32	1.630	0.554	0.543	0.060	4.885
37	Male	207.41	1.800	0.780	0.719	0.044	6.679
68	Female	128.65	1.600	0.496	0.473	0.045	4.199
39	Male	203.84	1.800	0.651	0.692	0.049	6.676
40	Female	136.35	1.680	0.529	0.515	0.052	4.213
<b>Mean</b>		173.16	1.745	0.658	0.644	0.049	5.682
<b>SD</b>		37.03	0.071	0.127	0.131	0.005	1.565
<b>SEM</b>		8.28	0.016	0.028	0.029	0.001	0.350
<b>Male Statistics</b>							
<b>Mean</b>		207.14	1.794	0.773	0.764	0.048	7.063
<b>SD</b>		16.97	0.041	0.064	0.062	0.005	0.926
<b>SEM</b>		5.37	0.013	0.020	0.020	0.002	0.293
<b>Female Statistics</b>							
<b>Mean</b>		139.18	1.696	0.543	0.525	0.050	4.301
<b>SD</b>		6.35	0.060	0.025	0.029	0.006	0.278
<b>SEM</b>		2.01	0.019	0.008	0.009	0.002	0.088

### Intermediate Exposure Group

Animal ID	Sex	Final Weight (g)	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
41	Male	201.59	1.800	0.803	0.780	0.035	7.455
42	Female	133.03	1.700	0.577	0.534	0.049	4.889
43	Male	202.8	1.810	0.759	0.724	0.056	6.542
44	Female	158.04	1.750	0.592	0.573	0.054	4.649
45	Male	212.09	1.810	0.858	0.838	0.052	7.453
46	Female	128.91	1.620	0.509	0.519	0.056	3.869
47	Male	188.63	1.790	0.700	0.682	0.049	6.356
48	Female	138.77	1.720	0.520	0.504	0.045	4.098
49	Male	209.95	1.820	0.768	0.724	0.050	6.903
50	Female	124.25	1.560	0.510	0.511	0.059	4.305
51	Male	192.6	1.810	0.750	0.701	0.036	5.982
52	Female	139.25	1.750	0.559	0.529	0.047	4.205
53	Male	210.02	1.790	0.776	0.755	0.047	6.933
54	Female	136.7	1.620	0.520	0.532	0.047	4.556
55	Male	206.82	1.800	0.681	0.687	0.044	7.021
56	Female	166.43	1.770	0.600	0.605	0.062	4.746
57	Male	198.44	1.760	0.783	0.835	0.060	8.062
8	Female	132.43	1.710	0.538	0.513	0.045	3.988
59	Male	226.1	1.790	0.853	0.831	0.051	7.114
60	Female	146.07	1.700	0.574	0.553	0.056	4.928
<b>Mean</b>		172.65	1.744	0.662	0.647	0.050	5.703
<b>SD</b>		35.09	0.074	0.123	0.122	0.007	1.401
<b>SEM</b>		7.85	0.016	0.028	0.027	0.002	0.313
<b>Male Statistics</b>							
<b>Mean</b>		204.90	1.798	0.773	0.756	0.048	6.982
<b>SD</b>		10.70	0.017	0.057	0.062	0.008	0.599
<b>SEM</b>		3.38	0.005	0.018	0.020	0.003	0.189
<b>Female Statistics</b>							
<b>Mean</b>		140.39	1.690	0.550	0.537	0.052	4.423
<b>SD</b>		13.12	0.068	0.035	0.032	0.006	0.381
<b>SEM</b>		4.15	0.022	0.011	0.010	0.002	0.121

### High Exposure Group

Animal ID	Sex	Final Weight (g)	Brain (g)	Kidney, Left (g)	Kidney, Right (g)	Adrenals (g)	Liver (g)
61	Male	203.67	1.830	0.711	0.706	0.066	6.508
62	Female	125.48	1.580	0.487	0.494	0.048	4.308
63	Male	206.59	1.840	0.739	0.767	0.051	7.761
64	Female	132.19	1.740	0.526	0.510	0.055	4.226
65	Male	198.42	1.760	0.787	0.750	0.039	7.825
66	Female	152.12	1.750	0.547	0.549	0.049	4.324
67	Male	225.88	1.840	0.791	0.806	0.050	7.131
38	Female	132.15	1.690	0.505	0.526	0.054	3.872
7	Male	194.93	1.770	0.720	0.750	0.033	6.596
70	Female	153.79	1.700	0.540	0.553	0.025	4.482
71	Male	202.71	1.780	0.782	0.774	0.045	6.367
72	Female	127.68	1.680	0.515	0.525	0.049	3.932
31	Male	200.1	1.790	0.764	0.795	0.051	6.307
74	Female	140.67	1.720	0.542	0.533	0.040	4.402
75	Male	211.94	1.840	0.754	0.749	0.059	7.017
76	Female	134.4	1.670	0.462	0.433	0.057	3.771
77	Male	203.99	1.820	0.781	0.790	0.044	6.754
78	Female	134.29	1.730	0.489	0.494	0.056	3.899
79	Male	203.75	1.780	0.763	0.756	0.046	6.588
80	Female	139.57	1.730	0.514	0.517	0.048	4.091
<b>Mean</b>		171.22	1.752	0.636	0.639	0.048	5.508
<b>SD</b>		35.96	0.068	0.129	0.132	0.009	1.472
<b>SEM</b>		8.04	0.015	0.029	0.030	0.002	0.329
<b>Male Statistics</b>							
<b>Mean</b>		205.20	1.805	0.759	0.764	0.048	6.885
<b>SD</b>		8.59	0.032	0.028	0.029	0.009	0.544
<b>SEM</b>		2.72	0.010	0.009	0.009	0.003	0.172
<b>Female Statistics</b>							
<b>Mean</b>		137.23	1.699	0.513	0.513	0.048	4.131
<b>SD</b>		9.49	0.050	0.028	0.035	0.010	0.251
<b>SEM</b>		3.00	0.016	0.009	0.011	0.003	0.079

## Male and Female Relative Tissue to Body Weight Data

### Control Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
1	0.00868	0.00378	0.00410	0.00022	0.03819
2	0.01221	0.00375	0.00383	0.00036	0.03137
3	0.00786	0.00370	0.00343	0.00024	0.03175
4	0.01152	0.00414	0.00436	0.00042	0.03025
5	0.00871	0.00375	0.00379	0.00022	0.03150
6	0.01142	0.00378	0.00372	0.00031	0.03031
69	0.00782	0.00329	0.00322	0.00020	0.03054
28	0.01288	0.00410	0.00399	0.00037	0.03088
9	0.00903	0.00371	0.00354	0.00024	0.03390
10	0.01213	0.00361	0.00364	0.00038	0.02872
11	0.00923	0.00403	0.00345	0.00022	0.03411
12	0.01269	0.00409	0.00382	0.00040	0.03510
13	0.00847	0.00354	0.00374	0.00025	0.03021
14	0.01110	0.00363	0.00371	0.00045	0.02860
15	0.00854	0.00394	0.00385	0.00029	0.03720
16	0.01295	0.00365	0.00372	0.00034	0.02951
17	0.00873	0.00397	0.00413	0.00026	0.03351
18	0.01103	0.00374	0.00396	0.00035	0.03265
19	0.00896	0.00369	0.00339	0.00021	0.03341
20	0.01295	0.00390	0.00352	0.00038	0.02859
Mean	0.01035	0.00379	0.00375	0.00031	0.03201
SD	0.00189	0.00021	0.00028	0.00008	0.00273
SEM	0.00042	0.00005	0.00006	0.00002	0.00061
<b>Male Statistics</b>					
Mean	0.00860	0.00374	0.00366	0.00023	0.03343
SD	0.00046	0.00022	0.00031	0.00003	0.00264
SEM	0.00015	0.00007	0.00010	0.00001	0.00084
<b>Female Statistics</b>					
Mean	0.01209	0.00384	0.00383	0.00038	0.03060
SD	0.00077	0.00021	0.00023	0.00004	0.00206
SEM	0.00026	0.00007	0.00008	0.00001	0.00069



# Low Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
21	0.00948	0.00400	0.00411	0.00024	0.03229
22	0.01238	0.00423	0.00403	0.00040	0.03211
23	0.00911	0.00407	0.00406	0.00023	0.03437
24	0.01293	0.00412	0.00389	0.00038	0.03450
25	0.00820	0.00375	0.00377	0.00021	0.03186
26	0.01200	0.00381	0.00366	0.00029	0.03042
27	0.00976	0.00386	0.00377	0.00028	0.03238
58	0.01159	0.00368	0.00380	0.00032	0.02867
29	0.00836	0.00378	0.00382	0.00024	0.03691
30	0.01156	0.00368	0.00362	0.00031	0.02848
73	0.00798	0.00363	0.00366	0.00023	0.03935
32	0.01220	0.00402	0.00370	0.00040	0.02965
33	0.00804	0.00363	0.00330	0.00026	0.03492
34	0.01306	0.00385	0.00370	0.00034	0.02769
35	0.00861	0.00370	0.00360	0.00019	0.03314
36	0.01153	0.00392	0.00384	0.00042	0.03457
37	0.00868	0.00376	0.00347	0.00021	0.03220
68	0.01244	0.00386	0.00368	0.00035	0.03264
39	0.00883	0.00319	0.00339	0.00024	0.03275
40	0.01232	0.00388	0.00378	0.00038	0.03090
Mean	0.01045	0.00382	0.00373	0.00030	0.03249
SD	0.00188	0.00022	0.00021	0.00007	0.00285
SEM	0.00042	0.00005	0.00005	0.00002	0.00064
<b>Male Statistics</b>					
Mean	0.00870	0.00374	0.00370	0.00023	0.03402
SD	0.00060	0.00024	0.00027	0.00002	0.00244
SEM	0.00019	0.00008	0.00008	0.00001	0.00077
<b>Female Statistics</b>					
Mean	0.01220	0.00390	0.00377	0.00036	0.03096
SD	0.00054	0.00018	0.00013	0.00004	0.00245
SEM	0.00018	0.00006	0.00004	0.00001	0.00082

# Intermediate Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
41	0.00893	0.00398	0.00387	0.00017	0.03698
42	0.01278	0.00434	0.00401	0.00037	0.03675
43	0.00893	0.00374	0.00357	0.00028	0.03226
44	0.01107	0.00375	0.00363	0.00034	0.02942
45	0.00853	0.00405	0.00395	0.00025	0.03514
46	0.01257	0.00395	0.00403	0.00043	0.03001
47	0.00949	0.00371	0.00362	0.00026	0.03370
48	0.01239	0.00375	0.00363	0.00032	0.02953
49	0.00867	0.00366	0.00345	0.00024	0.03288
50	0.01256	0.00410	0.00411	0.00047	0.03465
51	0.00940	0.00389	0.00364	0.00019	0.03106
52	0.01257	0.00401	0.00380	0.00034	0.03020
53	0.00852	0.00369	0.00359	0.00022	0.03301
54	0.01185	0.00380	0.00389	0.00034	0.03333
55	0.00870	0.00329	0.00332	0.00021	0.03395
56	0.01064	0.00361	0.00364	0.00037	0.02852
57	0.00887	0.00395	0.00421	0.00030	0.04063
8	0.01291	0.00406	0.00387	0.00034	0.03011
59	0.00792	0.00377	0.00368	0.00023	0.03146
60	0.01164	0.00393	0.00379	0.00038	0.03374
Mean	0.01045	0.00385	0.00376	0.00030	0.03287
SD	0.00180	0.00385	0.00023	0.00008	0.00302
SEM	0.00040	0.00382	0.00005	0.00002	0.00068
<b>Male Statistics</b>					
Mean	0.00880	0.00377	0.00369	0.00023	0.03411
SD	0.00045	0.00022	0.00026	0.00004	0.00288
SEM	0.00014	0.00007	0.00008	0.00001	0.00091
<b>Female Statistics</b>					
Mean	0.01210	0.00393	0.00384	0.00037	0.03163
SD	0.00077	0.00021	0.00018	0.00005	0.00276
SEM	0.00026	0.00007	0.00006	0.00002	0.00092

# High Exposure Group

Animal ID	Brain: BW	Kidney, Left: BW	Kidney, Right: BW	Adrenals: BW	Liver: BW
61	0.00899	0.00349	0.00347	0.00032	0.03195
62	0.01259	0.00388	0.00394	0.00038	0.03433
63	0.00891	0.00358	0.00371	0.00025	0.03757
64	0.01316	0.00398	0.00386	0.00042	0.03197
65	0.00887	0.00397	0.00378	0.00020	0.03944
66	0.01150	0.00360	0.00361	0.00032	0.02842
67	0.00815	0.00350	0.00357	0.00022	0.03157
38	0.01279	0.00382	0.00398	0.00041	0.02930
7	0.00908	0.00369	0.00385	0.00017	0.03384
70	0.01105	0.00351	0.00360	0.00016	0.02914
71	0.00878	0.00386	0.00382	0.00022	0.03141
72	0.01316	0.00403	0.00411	0.00038	0.03080
31	0.00895	0.00382	0.00397	0.00025	0.03152
74	0.01223	0.00385	0.00379	0.00028	0.03129
75	0.00868	0.00356	0.00353	0.00028	0.03311
76	0.01243	0.00344	0.00322	0.00042	0.02806
77	0.00892	0.00383	0.00387	0.00022	0.03311
78	0.01288	0.00364	0.00368	0.00042	0.02903
79	0.00874	0.00374	0.00371	0.00023	0.03233
80	0.01240	0.00368	0.00370	0.00034	0.02931
Mean	0.01061	0.00372	0.00374	0.00029	0.03188
SD	0.00192	0.00018	0.00021	0.00009	0.00290
SEM	0.00043	0.00004	0.00005	0.00002	0.00065
<b>Male Statistics</b>					
Mean	0.00881	0.00370	0.00373	0.00024	0.03358
SD	0.00026	0.00017	0.00016	0.00004	0.00275
SEM	0.00008	0.00005	0.00005	0.00001	0.00087
<b>Female Statistics</b>					
Mean	0.01242	0.00374	0.00375	0.00035	0.03017
SD	0.00068	0.00020	0.00025	0.00008	0.00193
SEM	0.00023	0.00007	0.00008	0.00003	0.00064

## Male and Female Relative Tissue to Brain Weight Data

### Control Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
1	0.435	0.473	0.025	4.401
2	0.307	0.314	0.029	2.569
3	0.471	0.436	0.030	4.041
4	0.359	0.378	0.036	2.625
5	0.430	0.435	0.025	3.617
6	0.331	0.326	0.027	2.653
69	0.420	0.412	0.025	3.906
28	0.318	0.310	0.028	2.397
9	0.411	0.392	0.026	3.756
10	0.298	0.300	0.032	2.368
11	0.437	0.374	0.024	3.695
12	0.322	0.301	0.031	2.766
13	0.419	0.442	0.030	3.567
14	0.327	0.334	0.041	2.575
15	0.462	0.451	0.034	4.357
16	0.281	0.287	0.027	2.278
17	0.454	0.473	0.030	3.839
18	0.339	0.359	0.032	2.961
19	0.412	0.378	0.023	3.726
20	0.301	0.272	0.029	2.208

<b>Mean</b>	0.377	0.372	0.029	3.215
<b>SD</b>	0.064	0.065	0.004	0.739
<b>SEM</b>	0.014	0.015	0.001	0.165

#### Male Statistics

<b>Mean</b>	0.435	0.427	0.027	3.890
<b>SD</b>	0.021	0.036	0.004	0.292
<b>SEM</b>	0.007	0.011	0.001	0.092

#### Female Statistics

<b>Mean</b>	0.318	0.318	0.031	2.540
<b>SD</b>	0.022	0.032	0.004	0.231
<b>SEM</b>	0.007	0.011	0.001	0.077

### Low Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
21	0.422	0.434	0.026	3.406
22	0.341	0.326	0.032	2.594
23	0.447	0.446	0.025	3.775
24	0.319	0.301	0.030	2.668
25	0.457	0.460	0.025	3.884
26	0.318	0.305	0.024	2.535
27	0.395	0.386	0.029	3.318
58	0.317	0.328	0.028	2.474
29	0.452	0.457	0.028	4.418
30	0.318	0.314	0.026	2.464
73	0.455	0.459	0.029	4.933
32	0.329	0.304	0.033	2.430
33	0.451	0.410	0.032	4.345
34	0.295	0.283	0.026	2.120
35	0.429	0.418	0.023	3.847
36	0.340	0.333	0.037	2.997
37	0.433	0.399	0.024	3.711
68	0.310	0.296	0.028	2.624
39	0.362	0.384	0.027	3.709
40	0.315	0.307	0.031	2.508

<b>Mean</b>	0.375	0.367	0.028	3.238
<b>SD</b>	0.061	0.064	0.003	0.806
<b>SEM</b>	0.014	0.014	0.001	0.180

#### Male Statistics

<b>Mean</b>	0.430	0.425	0.027	3.934
<b>SD</b>	0.031	0.030	0.003	0.494
<b>SEM</b>	0.010	0.009	0.001	0.156

#### Female Statistics

<b>Mean</b>	0.320	0.309	0.029	2.541
<b>SD</b>	0.014	0.016	0.004	0.220
<b>SEM</b>	0.005	0.005	0.001	0.073

### Intermediate Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
41	0.446	0.433	0.019	4.142
42	0.339	0.314	0.029	2.876
43	0.419	0.400	0.031	3.614
44	0.338	0.327	0.031	2.657
45	0.474	0.463	0.029	4.118
46	0.314	0.320	0.035	2.388
47	0.391	0.381	0.027	3.551
48	0.302	0.293	0.026	2.383
49	0.422	0.398	0.027	3.793
50	0.327	0.328	0.038	2.760
51	0.414	0.387	0.020	3.305
52	0.319	0.302	0.027	2.403
53	0.434	0.422	0.026	3.873
54	0.321	0.328	0.029	2.812
55	0.378	0.382	0.024	3.901
56	0.339	0.342	0.035	2.681
57	0.445	0.474	0.034	4.581
8	0.315	0.300	0.026	2.332
59	0.477	0.464	0.028	3.974
60	0.338	0.325	0.033	2.899
Mean	0.378	0.369	0.029	3.252
SD	0.059	0.059	0.005	0.711
SEM	0.013	0.013	0.001	0.159

#### Male Statistics

Mean	0.430	0.420	0.027	3.885
SD	0.032	0.036	0.005	0.356
SEM	0.010	0.011	0.001	0.113

#### Female Statistics

Mean	0.325	0.318	0.031	2.619
SD	0.013	0.015	0.004	0.222
SEM	0.004	0.005	0.001	0.074

Significant difference Intermediate vs.  
High exposure group (p <= 0.05)

### High Exposure Group

Animal ID	Kidney, Left: Brain	Kidney, Right: Brain	Adrenals: Brain	Liver: Brain
61	0.389	0.386	0.036	3.556
62	0.308	0.313	0.030	2.727
63	0.402	0.417	0.028	4.218
64	0.302	0.293	0.032	2.429
65	0.447	0.426	0.022	4.446
66	0.313	0.314	0.028	2.471
67	0.430	0.438	0.027	3.876
38	0.299	0.311	0.032	2.291
7	0.407	0.424	0.019	3.727
70	0.318	0.325	0.015	2.636
71	0.439	0.435	0.025	3.577
72	0.307	0.313	0.029	2.340
31	0.427	0.444	0.028	3.523
74	0.315	0.310	0.023	2.559
75	0.410	0.407	0.032	3.814
76	0.277	0.259	0.034	2.258
77	0.429	0.434	0.024	3.711
78	0.283	0.286	0.032	2.254
79	0.429	0.425	0.026	3.701
80	0.297	0.299	0.028	2.365
Mean	0.361	0.363	0.028	3.124
SD	0.063	0.065	0.005	0.747
SEM	0.014	0.014	0.001	0.167

#### Male Statistics

Mean	0.421	0.424	0.027	3.815
SD	0.018	0.017	0.005	0.299
SEM	0.006	0.005	0.002	0.095

#### Female Statistics

Mean	0.302	0.302	0.028	2.433
SD	0.013	0.019	0.006	0.164
SEM	0.004	0.006	0.002	0.055

Significant difference Intermediate vs.  
High exposure group (p <= 0.05)

## APPENDIX M. REPEATED EXPOSURE STUDY CLINICAL CHEMISTRY AND HEMATOLOGY DATA

### Appendix Abbreviations

K/uL	count * 1000 per microliter
M/uL	count * 1000000 per microliter
ND	not detected
NDR	no data reported
<b>Clinical Chemistry Parameters</b>	
ALB	albumin
ALKP	alkaline phosphatase
ALT	alanine transaminase
AST	aspartate transaminase
BUN	blood urea nitrogen
CHOL	cholesterol
CK	creatine kinase
Cl-	chloride
CREA	creatinine
GLOB	globulins
GLU	glucose
K+	potassium
Na+	sodium
TBIL	total bilirubin
TP	total protein
TRIG	triglycerides
<b>Hematology Parameters</b>	
BA	basophils
EO	eosinophils
HB	hemoglobin
HCT	hematocrit
LY	lymphocytes
MCH	mean corpuscular
MCHC	mean corpuscular hemoglobin concentration
MCV	mean corpuscular volume
MO	monocytes
MPV	mean platelet volume
NE	neutrophils
PLT	platelets
RBC	red blood cells
RDW	red cell distribution width
WBC	white blood cells

## Male and Female Clinical Chemistry Data

Control Exposure Group									
gender	animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	1	2.9	178	48	81	20	59	578	0.4
female	2	2.8	135	48	98	15	88	482	0.2
male	3	4.1	292	81	121	23	71	424	0.6
female	4	2.7	146	65	108	17	79	498	0.4
male	5	3	226	61	128	19	54	837	0.3
female	6	2.9	183	48	126	19	91	591	0.4
male	69	2.8	165	68	144	23	47	NDR	0.6
female	28	2.9	96	48	117	21	77	NDR	0.2
male	9	3	194	57	128	16	59	660	0.4
female	10	2.7	139	52	102	19	88	624	0.3
male	11	4.4	238	67	130	25	73	621	0.6
female	12	2.8	98	47	211	15	94	2036	0.2
male	13	3.7	212	86	129	19	67	609	0.5
female	14	2.9	100	52	83	22	81	546	0.4
male	15	2.5	105	57	209	15	52	NDR	0.4
female	16	3.3	138	55	108	18	89	721	0.3
male	17	3.4	224	77	148	19	69	793	0.5
female	18	3.5	154	46	182	16	109	1049	0.4
male	19	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	20	2.8	100	51	90	18	84	706	0.3

gender	animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	1	2.9	190	0.2	5.8	42	148	4.9	102
female	2	2.9	146	0.1	5.7	35	148	4.6	106
male	3	2.4	213	0.4	6.5	132	146	4.7	100
female	4	3.5	180	0.2	6.3	29	157	5.5	107
male	5	2.5	143	0.2	5.5	67	158	5.6	107
female	6	2.4	130	0.2	5.3	50	135	4.3	95
male	69	2.6	176	0.2	5.4	53	148	5.3	104
female	28	2.9	136	0.5	5.7	21	147	5.3	108
male	9	2.7	165	0.1	5.7	89	150	5.4	103
female	10	2.4	111	<0.1*	5.1	32	149	4.5	102
male	11	2	188	0.3	6.4	90	157	4.9	102
female	12	3	141	0.8	5.9	31	NDR	NDR	NDR
male	13	2.8	161	0.4	6.4	75	156	5.1	106
female	14	2.6	142	0.2	5.5	31	146	4.7	105
male	15	3.5	195	0.6	6	65	156	6	103
female	16	1.9	133	0.1	5.2	31	169	5.6	110
male	17	2.8	176	0.3	6.1	133	143	5	97
female	18	2.2	166	0.3	5.7	29	138	4.5	93
male	19	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	20	2.9	132	0.4	5.7	24	147	5.3	105

\*Reported from the VetTest as <0.1 mg/dL, not used in average

Low Exposure Group									
gender	animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	21	4.2	274	84	113	26	66	489	0.6
female	22	2.7	138	37	156	22	79	1299	0.3
male	23	4	251	113	115	24	71	528	0.5
female	24	3.8	157	87	129	21	101	607	0.4
male	25	3.2	199	72	104	19	53	675	0.4
female	26	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
male	27	2.9	189	87	185	23	51	1181	0.4
female	58	3	115	61	261	17	86	NDR	0.3
male	29	3.2	112	48	242	19	52	NDR	0.3
female	30	2.6	92	38	184	20	73	1172	0.3
male	73	3.5	188	94	209	18	69	1270	0.4
female	32	3.4	120	47	144	21	83	961	0.3
male	33	3	149	70	165	12	61	1057	0.4
female	34	2.9	111	59	181	20	78	1058	0.3
male	35	3	195	40	124	18	67	1262	0.3
female	36	2.9	111	66	190	26	84	1197	0.4
male	37	3.8	206	89	127	14	65	541	0.5
female	68	3.3	78	37	309	18	85	NDR	0.2
male	39	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	40	2.8	100	53	421	18	78	2036	0.2

gender	animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	21	1.7	167	0.2	5.9	65	128	3.8	91
female	22	2.5	143	0.2	5.2	29	141	5	103
male	23	1.8	142	0.3	5.9	99	159	4.7	107
female	24	2.4	133	0.4	6.2	29	146	5.2	100
male	25	2.7	125	0.1	5.9	46	150	5.2	105
female	26	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
male	27	2.6	176	0.2	5.5	51	147	4.1	104
female	58	2.8	140	0.5	5.7	34	NDR	NDR	NDR
male	29	2.9	143	1	6.1	36	149	5.9	104
female	30	2.6	162	0.3	5.2	34	NDR	NDR	NDR
male	73	2	156	0.1	5.5	58	170	6.3	103
female	32	2.6	138	0.4	6	38	147	5.1	105
male	33	2.6	199	0.1	5.6	100	148	4.7	103
female	34	2.6	126	0.2	5.5	24	147	4.7	107
male	35	2.8	178	<0.1*	5.8	136	148	6	105
female	36	2.8	155	0.4	5.6	35	151	4.9	104
male	37	1.9	168	0.2	5.7	126	153	5.8	101
female	68	2.9	151	1.8	6.2	45	NDR	NDR	NDR
male	39	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	40	2.9	183	0.6	5.8	26	NDR	NDR	NDR

\*Reported from the VetTest as <0.1 mg/dL, not used in average



Intermediate Exposure Group									
gender	animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	41	3.7	243	65	89	23	73	346	0.6
female	42	2.9	115	58	144	20	90	1109	0.3
male	43	3.2	170	107	209	18	55	986	0.3
female	44	3.1	220	81	131	21	103	559	0.4
male	45	3.7	205	89	156	19	70	882	0.5
female	46	2.9	112	54	227	23	77	NDR	0.3
male	47	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	48	2.7	193	52	102	19	82	632	0.3
male	49	3.2	164	68	197	19	60	1414	0.3
female	50	2.8	122	47	150	20	83	966	0.2
male	51	2.8	131	75	199	22	52	NDR	0.4
female	52	3.5	188	45	110	20	93	517	0.5
male	53	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	54	3.7	144	60	116	17	102	578	0.3
male	55	3.9	170	59	150	19	68	909	0.5
female	56	3.8	172	76	94	20	94	438	0.4
male	57	4.4	208	73	123	20	78	555	0.7
female	8	2.6	133	37	86	12	77	543	0.3
male	59	3	189	59	202	18	64	1199	0.3
female	60	3	92	49	151	14	92	1327	0.2

gender	animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	41	3.1	186	0.4	6.8	64	164	3.8	108
female	42	2.7	124	0.3	5.6	34	154	5	107
male	43	1.4	143	0.1	4.6	44	161	6.1	110
female	44	2.6	165	0.3	5.7	38	143	5.2	100
male	45	2.8	174	0.3	6.5	86	156	5.5	104
female	46	2.3	134	0.4	5.3	29	154	5	107
male	47	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
female	48	2.4	140	0.1	5.1	29	152	4.7	103
male	49	1.9	162	0.2	5.1	61	164	7.2	110
female	50	3.2	160	0.5	6	29	147	5.1	105
male	51	2.7	173	0.4	5.5	95	145	5.5	104
female	52	2.7	142	0.4	6.3	35	177	5.4	116
male	53	NDR	NDR	NDR	NDR	NDR	145	6.9	104
female	54	2.3	152	0.4	6	22	143	4.3	99
male	55	2	171	0.2	5.8	147	141	5.8	100
female	56	2.4	174	0.2	6.2	43	158	5.2	105
male	57	2.1	226	0.3	6.5	144	153	4.9	101
female	8	2.7	134	0.2	5.3	17	156	4.8	109
male	59	2.4	196	0.2	5.5	73	154	5.9	105
female	60	3.1	139	0.5	6.1	24	147	5.2	107

\*Reported from the VetTest as <0.1 mg/dL, not used in average

High Exposure Group									
gender	animal ID	ALB (g/dL)	ALKP (U/L)	ALT (U/L)	AST (U/L)	BUN (mg/dL)	CHOL (mg/dL)	CK (U/L)	CREA (mg/dL)
male	61	3.1	191	59	109	23	60	626	0.5
female	62	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
male	63	3.4	200	68	124	22	60	509	0.5
female	64	2.9	119	59	158	20	96	789	0.4
male	65	3.3	188	76	97	21	59	556	0.4
female	66	2.6	99	59	282	21	76	NDR	0.3
male	67	2.9	190	63	126	21	48	899	0.4
female	38	2.8	159	68	177	22	80	1048	0.4
male	7	2.8	142	63	127	23	45	1078	0.4
female	70	3.7	136	69	141	19	93	777	0.4
male	71	3.2	205	84	160	22	60	995	0.5
female	72	2.6	113	55	149	19	76	1092	0.2
male	31	3	234	55	126	20	65	770	0.4
female	74	2.7	110	45	89	19	84	700	0.3
male	75	3.9	221	56	93	22	64	665	0.6
female	76	2.8	136	74	117	19	84	585	0.3
male	77	2.9	156	90	123	18	55	789	0.4
female	78	2.8	156	67	118	18	89	671	0.4
male	79	2.9	138	87	223	20	55	NDR	0.3
female	80	2.8	111	56	177	23	78	1008	0.3

gender	animal ID	GLOB (g/dL)	GLU (mg/dL)	TBIL (mg/dL)	TP (g/dL)	TRIG (mg/dL)	Na+ (mmol/L)	K+ (mmol/L)	Cl- (mmol/L)
male	61	2.7	155	0.1	5.8	79	150	4.5	103
female	62	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
male	63	2.7	206	0.1	6.1	83	152	5.5	105
female	64	2.9	141	0.2	5.8	19	147	4.9	105
male	65	2.7	167	0.2	6	50	149	5.1	103
female	66	2.6	147	0.4	5.2	30	149	4.7	107
male	67	2.7	146	0.1	5.6	53	149	5.6	105
female	38	2.4	112	0.2	5.2	25	171	6.4	114
male	7	2.4	153	<0.1*	5.2	79	142	5.1	101
female	70	2.2	138	0.4	5.9	39	168	5.4	111
male	71	2.4	155	0.2	5.6	40	161	5.3	106
female	72	2.8	146	0.5	5.3	20	145	5.4	108
male	31	2	165	<0.1*	5	53	156	5.3	106
female	74	2.6	141	0.3	5.3	35	147	4.6	104
male	75	1.8	174	0.2	5.8	98	201	6.1	129
female	76	2.6	105	0.2	5.4	34	150	4.8	103
male	77	2.8	167	0.1	5.7	81	148	6.4	104
female	78	2.2	116	0.1	5	25	154	6.7	105
male	79	2.1	196	0.2	5	140	151	5.1	106
female	80	2.2	121	0.3	5	24	156	5	107

\*Reported from the VetTest as <0.1 mg/dL, not used in average

## Male and Female Hematology Data

Male Rats											
Animal ID	Group	Date	Time	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %
Rat 1_01	Control	5/13/2016	2:40 PM	6.52	1.49	4.63	0.38	0	0.02	22.92	71
Rat 1_02	Control	5/13/2016	2:42 PM	6.3	1.54	4.2	0.54	0.02	0.01	24.37	66.74
Rat 3_01	Control	5/13/2016	3:07 PM	5.72	1.44	3.63	0.58	0.05	0.02	25.19	63.49
Rat 3_02	Control	5/13/2016	3:11 PM	6.32	1.69	4.02	0.57	0.01	0.03	26.72	63.67
Rat 5_01	Control	5/13/2016	3:41 PM	2.86	0.54	2.13	0.17	0.01	0	18.98	74.64
Rat 5_02	Control	5/13/2016	3:51 PM	3.06	0.57	2.23	0.25	0	0.01	18.55	72.82
Rat 69_01	Control	5/13/2016		4.04	0.83	2.92	0.29	0	0	20.61	72.2
Rat 69_02	Control	5/13/2016	2:17 PM	3.94	0.79	2.94	0.21	0	0	19.97	74.6
Rat 9_01	Control	5/13/2016	4:19 PM	7.56	1.51	5.7	0.33	0.01	0.01	19.92	75.42
Rat 9_02	Control	5/13/2016	4:23 PM	7.82	1.73	5.56	0.53	0	0	22.13	71.16
Rat 11_01	Control	5/13/2016	4:45 PM	4.86	0.93	3.64	0.13	0.11	0.06	19.08	74.81
Rat 11_02	Control	5/13/2016	4:47 PM	4.8	1.03	3.49	0.16	0.08	0.05	21.45	72.62
Rat 13_01	Control	5/13/2016	5:11 PM	4.2	0.71	3.29	0.2	0	0	16.83	78.39
Rat 13_02	Control	5/13/2016	5:13 PM	4.24	0.74	3.1	0.4	0	0	17.36	73.14
Rat 15_01	Control	5/13/2016	5:34 PM	0.86	0.13	0.7	0.03	0	0	15.08	81.67
Rat 15_03	Control	5/13/2016	5:40 PM	1.08	0.15	0.84	0.06	0.01	0.01	14.33	77.86
Rat 17_01	Control	5/13/2016	6:02 PM	5.8	0.87	4.47	0.45	0	0	15.01	77.09
Rat 17_02	Control	5/13/2016	6:04 PM	6.56	1.18	4.75	0.57	0.02	0.04	17.92	72.41
Rat 19_01	Control	5/13/2016	6:23 PM	1	0.04	0.94	0.01	0	0	4.41	94.34
Rat 19_03	Control	5/13/2016	6:28 PM	0.94	0.09	0.82	0.03	0	0	9.14	86.71
Rat 21_01	Low	5/13/2016	2:48 PM	3.22	0.64	2.36	0.2	0.02	0	19.82	73.25
Rat 21_02	Low	5/13/2016	2:52 PM	3.42	0.69	2.52	0.19	0.01	0	20.1	73.82
Rat 23_01	Low	5/13/2016	3:14 PM	2.54	0.48	1.88	0.17	0.01	0	18.73	74.19
Rat 23_02	Low	5/13/2016	3:17 PM	2.62	0.61	1.82	0.19	0	0	23.29	69.32
Rat 25_01	Low	5/13/2016	3:54 PM	6.02	1.42	4.14	0.46	0.01	0	23.52	68.73
Rat 25_02	Low	5/13/2016	3:57 PM	6.24	1.4	4.38	0.46	0	0	22.4	70.12
Rat 27_01	Low	5/13/2016	2:22 PM	5.08	1.16	3.51	0.39	0.01	0	22.76	69.18
Rat 27_02	Low	5/13/2016	2:44 PM]	5.16	1.14	3.6	0.42	0	0	22.17	69.76
Rat 29_01	Low	5/13/2016	4:26 PM	1.48	0.24	1.2	0.04	0	0	15.89	81.05
Rat 29_02	Low	5/13/2016	4:30 PM	1.54	0.31	1.08	0.13	0.01	0	20.25	70.25
Rat 73_01	Low	5/13/2016	4:52 PM	5.2	0.86	4.2	0.14	0	0	16.57	80.84
Rat 73_02	Low	5/13/2016	4:54 PM	5.38	0.82	4.37	0.19	0	0	15.29	81.15
Rat 33_01	Low	5/13/2016	5:15 PM	5.02	0.89	3.89	0.22	0.01	0.01	17.67	77.55
Rat 33_02	Low	5/13/2016	5:18 PM	5.12	0.93	3.8	0.35	0.03	0.01	18.19	74.14
Rat 35_01	Low	5/13/2016	5:42 PM	3.48	0.77	2.52	0.16	0.03	0.01	22.13	72.28
Rat 35_02	Low	5/13/2016	5:45 PM	2.98	0.58	2.15	0.22	0.03	0	19.38	72.08
Rat 37_01	Low	5/13/2016	6:07 PM	5.68	1.12	4.17	0.39	0	0	19.64	73.37
Rat 37_02	Low	5/13/2016	6:09 PM	5.72	1.09	4.4	0.23	0	0	19.04	76.91
Rat 39_01	Low	5/13/2016	6:31 PM	3.18	0.59	2.4	0.18	0	0.01	18.69	75.33
Rat 39_02	Low	5/13/2016	6:34 PM	2.94	0.53	2.28	0.1	0.02	0	18.14	77.55

Animal ID	Group	MO% %	EO% %	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
Rat 1_01	Control	5.8	0.01	0.28	8.6	14	43.8	50.9	16.3	32	17.9	818	6.4
Rat 1_02	Control	8.54	0.27	0.08	8.44	13.5	43.6	51.7	16	31	19	797	6.4
Rat 3_01	Control	10.13	0.84	0.36	8.66	14.9	46.9	54.1	17.2	31.8	17	726	6.1
Rat 3_02	Control	8.94	0.15	0.53	9.97	16.5	53.2	53.4	16.5	31	17.6	665	6.1
Rat 5_01	Control	6.07	0.3	0	8.8	14.9	48	54.5	16.9	31	17.7	456	6.1
Rat 5_02	Control	8.18	0.14	0.31	8.8	14.7	47.4	53.9	16.7	31	18	566	6
Rat 69_01	Control	7.2	0	0	9.66	16.5	55	56.9	17.1	30	16.1	752	6.2
Rat 69_02	Control	5.3	0	0.12	9.58	16.2	52.7	55	16.9	30.7	16.6	720	6
Rat 9_01	Control	4.41	0.13	0.12	9.56	15.3	51.7	54.1	16	29.6	17.3	803	6.4
Rat 9_02	Control	6.72	0	0	9.18	15.4	49.8	54.3	16.8	30.9	17	849	6.4
Rat 11_01	Control	2.66	2.28	1.17	9.53	15.3	51.1	53.6	16.1	29.9	17.1	638	6.1
Rat 11_02	Control	3.23	1.73	0.97	9.18	15.5	49.3	53.7	16.9	31.4	16.4	658	6
Rat 13_01	Control	4.66	0.11	0	9.61	15.6	52.6	54.7	16.2	29.7	17.9	815	6.4
Rat 13_02	Control	9.39	0	0.11	9.54	16.2	52.1	54.6	17	31.1	17.6	810	6.2
Rat 15_01	Control	3.25	0	0	5.84	8.9	31.4	53.8	15.2	28.3	16.5	68	8
Rat 15_03	Control	5.68	1.28	0.86	5	8.1	26.5	53	16.2	30.6	17	255	8
Rat 17_01	Control	7.81	0.08	0	9.63	16.3	52.8	54.8	16.9	30.9	16.7	966	6.3
Rat 17_02	Control	8.69	0.31	0.67	9.22	16	50.4	54.7	17.4	31.7	16.8	840	6.4
Rat 19_01	Control	1.24	0	0	4.36	6.6	23.9	54.8	15.1	27.6	15.6	25	10
Rat 19_03	Control	3.65	0.5	0	4.05	6.2	22.6	55.8	15.3	27.4	14.7	23	9.5
Rat 21_01	Low	6.25	0.69	0	9.21	15	49.9	54.2	16.3	30.1	17.4	524	6
Rat 21_02	Low	5.66	0.28	0.14	8.85	15.2	47.8	54	17.2	31.8	18.2	545	6.1
Rat 23_01	Low	6.83	0.25	0	9.51	16.2	52	54.7	17	31.2	17.9	790	6.1
Rat 23_02	Low	7.38	0.01	0	9.63	15.6	52.5	54.5	16.2	29.7	17.9	825	6.3
Rat 25_01	Low	7.61	0.14	0	9.1	16.1	49.3	54.2	17.7	32.7	17.4	802	6.6
Rat 25_02	Low	7.4	0	0.08	9.16	15.6	51	55.7	17	30.6	17.4	708	6.4
Rat 27_01	Low	7.74	0.24	0.08	9.33	15.5	51.2	54.9	16.6	30.3	17	100	8
Rat 27_02	Low	8.07	0	0	9.18	15.3	51.2	55.8	16.7	29.9	16.5	95	9.6
Rat 29_01	Low	2.74	0.32	0	8.02	12.9	43.9	54.8	16.1	29.4	16.4	108	8.5
Rat 29_02	Low	8.7	0.81	0	7.7	13	41.3	53.7	16.9	31.5	16.6	88	7.7
Rat 73_01	Low	2.6	0	0	9.57	15.7	51.9	54.2	16.4	30.3	17.8	77	7.9
Rat 73_02	Low	3.56	0	0	9.54	15.4	51.9	54.4	16.1	29.7	17.3	119	10.2
Rat 33_01	Low	4.43	0.17	0.19	9.74	16.6	51.7	53.1	17	32.1	17.2	818	6.2
Rat 33_02	Low	6.91	0.56	0.19	9.74	15.5	52.1	53.5	15.9	29.8	17.2	844	6.5
Rat 35_01	Low	4.46	0.99	0.15	9.34	15.8	51.3	54.9	16.9	30.8	17	81	11
Rat 35_02	Low	7.28	1.1	0.16	9.31	16.1	50.6	54.4	17.3	31.8	17	183	7.6
Rat 37_01	Low	6.85	0.06	0.08	9.58	15.3	52	54.3	16	29.4	17.6	891	6.4
Rat 37_02	Low	4.04	0	0	9.48	16.2	51.7	54.5	17.1	31.3	17.9	915	6.7
Rat 39_01	Low	5.68	0.01	0.28	8.28	13.2	44.8	54.1	15.9	29.5	16.6	98	9
Rat 39_02	Low	3.31	0.85	0.15	7.44	12	40	53.7	16.1	30	17	133	10

Animal ID	Group	Date	Time	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %
Rat 41_01	Intermediate	5/13/2016	2:55 PM	5.54	1.15	3.85	0.53	0	0.01	20.79	69.45
Rat 41_02	Intermediate	5/13/2016	2:57 PM	5.7	1.32	3.88	0.47	0.02	0.01	23.12	68.08
Rat 43_01	Intermediate	5/13/2016	3:19 PM	5.44	1.26	3.79	0.39	0	0	23.21	69.58
Rat 43_01	Intermediate	5/13/2016	3:21 PM	5.68	1.29	3.79	0.6	0	0.01	22.65	66.64
Rat 45_01	Intermediate	5/13/2016	4:01 PM	6.12	2.14	3.41	0.53	0.03	0	35.04	55.7
Rat 45_02	Intermediate	5/13/2016	4:06 PM	6.18	2.22	3.36	0.56	0.03	0.01	35.92	54.38
Rat 47_01	Intermediate	5/13/2016	2:27 PM	3.58	0.5	2.77	0.3	0.01	0	13.83	77.38
Rat 47_02	Intermediate	5/13/2016	2:30 PM	3.42	0.56	2.59	0.27	0	0	16.29	75.7
Rat 49_01	Intermediate	5/13/2016	4:33 PM	7.1	2.03	4.76	0.31	0	0	28.6	66.98
Rat 49_02	Intermediate	5/13/2016	4:36 PM	6.88	1.68	4.78	0.41	0.01	0	24.45	69.44
Rat 51_01	Intermediate	5/13/2016	4:57 PM	3.64	0.5	2.93	0.2	0.01	0	13.81	80.55
Rat 51_02	Intermediate	5/13/2016	5:00 PM	3.82	0.56	3.07	0.2	0	0	14.63	80.24
Rat 53_01	Intermediate	5/13/2016	5:21 PM	4.58	1.18	3.09	0.28	0.01	0.02	25.87	67.36
Rat 53_02	Intermediate	5/13/2016	5:23 PM	4.64	0.98	3.53	0.12	0.01	0	21.03	76.04
Rat 55_02	Intermediate	5/13/2016	5:51 PM	9.12	2.55	5.91	0.55	0.04	0.07	27.91	64.85
Rat 55_03	Intermediate	5/13/2016	5:54 PM	9.24	2.38	6.28	0.51	0.04	0.03	25.78	67.96
Rat 57_01	Intermediate	5/13/2016	6:12 PM	7.08	2.02	4.14	0.44	0.3	0.18	28.52	58.47
Rat 57_02	Intermediate	5/13/2016	6:14 PM	6.92	1.95	4.2	0.4	0.23	0.14	28.11	60.71
Rat 59_02	Intermediate	5/13/2016	6:49 PM	3.1	0.65	2.37	0.06	0.01	0	20.98	76.52
Rat 59_03	Intermediate	5/13/2016	6:52 PM	3.24	0.68	2.48	0.07	0.01	0	20.91	76.55
Rat 61_01	High	5/13/2016	3:03 PM	8.6	2.34	5.38	0.73	0.08	0.07	27.23	62.58
Rat 61_02	High	5/13/2016	3:05 PM	8.28	2.03	5.48	0.64	0.06	0.07	24.49	66.16
Rat 63_02	High	5/13/2016	3:24 PM	5.94	2.09	3.46	0.37	0.01	0	35.16	58.24
Rat 63_02	High	5/13/2016	3:27 PM	6.34	1.91	3.81	0.59	0.02	0.01	30.1	60.03
Rat 65_01	High	5/13/2016	4:09 PM	8.64	2.47	5.44	0.72	0.01	0	28.61	62.91
Rat 65_02	High	5/13/2016	4:11 PM	8.68	2.43	5.6	0.64	0	0.01	28.03	64.48
Rat 67_01	High	5/13/2016	2:34 PM	3.84	1.1	2.42	0.26	0.03	0.02	28.59	63.12
Rat 67_02	High	5/13/2016	2:37 PM	3.9	1.23	2.46	0.11	0.07	0.04	31.59	62.95
Rat 7_01	High	5/13/2016	4:39 PM	4.54	1.2	3.09	0.23	0.02	0	26.48	68.09
Rat 7_02	High	5/13/2016	4:42 PM	4.56	1.14	3.24	0.15	0.03	0	24.93	71.11
Rat 71_01	High	5/13/2016	5:03 PM	3.04	0.85	2.06	0.1	0.02	0.01	28.12	67.73
Rat 71_02	High	5/13/2016	5:06 PM	3.2	0.89	2.16	0.15	0.01	0	27.72	67.39
Rat 31_01	High	5/13/2016	5:27 PM	1.54	0.09	1.43	0.02	0	0	6.1	92.6
Rat 31_02	High	5/13/2016	5:29 PM	1.7	0.14	1.54	0.02	0	0	8.15	90.71
Rat 75_01	High	5/13/2016	5:56 PM	6.12	1.12	4.8	0.18	0.01	0	18.38	78.47
Rat 75_01	High	5/13/2016	5:59 PM	6.44	1.38	4.68	0.38	0	0	21.47	72.61
Rat 77_01	High	5/13/2016	6:17 PM	5.26	1.28	3.71	0.27	0	0	24.29	70.6
Rat 77_02	High	5/13/2016	6:19 PM	5.4	1.34	3.73	0.33	0	0	24.77	69.14
Rat 79_01	High	5/13/2016	6:54 PM	5.2	0.94	4.05	0.19	0.01	0.01	18.16	77.81
Rat 79_02	High	5/13/2016	6:57 PM	5.22	1.02	4.06	0.13	0.01	0	19.54	77.8

Animal ID	Group	MO% %	EO% %	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
Rat 41_01	Intermediate	9.52	0.06	0.18	8.9	15.2	44.9	50.5	17.1	33.9	18.2	821	7.4
Rat 41_02	Intermediate	8.26	0.33	0.21	9.45	14.9	47.9	50.7	15.8	31.1	18.9	826	7.7
Rat 43_01	Intermediate	7.22	0	0	8.52	15.1	46.9	55	17.7	32.2	17	112	7.9
Rat 43_01	Intermediate	10.64	0	0.09	8.83	15.4	48.6	55	17.4	31.7	17.4	107	7.2
Rat 45_01	Intermediate	8.71	0.49	0.07	10.13	17.3	57.4	56.7	17.1	30.1	18.6	452	6.5
Rat 45_02	Intermediate	9.1	0.44	0.16	9.88	17	54.9	55.6	17.2	31	17.4	655	6.5
Rat 47_01	Intermediate	8.46	0.33	0	9.09	14.9	50	55	16.4	29.8	16.8	74	10.3
Rat 47_02	Intermediate	7.86	0.14	0	9.11	15.2	49.7	54.6	16.7	30.6	17	101	11.3
Rat 49_01	Intermediate	4.34	0.02	0.07	10.11	16.3	54.7	54.1	16.1	29.8	17	125	8.6
Rat 49_02	Intermediate	5.96	0.15	0	9.68	16.1	52.2	53.9	16.6	30.8	17	111	8.8
Rat 51_01	Intermediate	5.36	0.28	0	9.27	15.5	50.1	54	16.7	30.9	16.6	38	10.5
Rat 51_02	Intermediate	5.13	0	0	9.49	15.4	51.2	54	16.2	30.1	16.7	34	10.9
Rat 53_01	Intermediate	6.04	0.25	0.47	8.92	15.2	48.8	54.7	17	31.1	17.3	65	10.3
Rat 53_02	Intermediate	2.69	0.13	0.1	8.86	14.9	48.6	54.8	16.8	30.7	16.4	61	10.6
Rat 55_02	Intermediate	6.06	0.44	0.75	9.77	16.5	53.3	54.6	16.9	31	17.5	834	6.7
Rat 55_03	Intermediate	5.54	0.41	0.31	9.61	15.8	52.6	54.7	16.4	30	17.5	816	7
Rat 57_01	Intermediate	6.26	4.26	2.49	9.17	15.2	49.3	53.8	16.6	30.8	18.3	751	6.5
Rat 57_02	Intermediate	5.83	3.27	2.07	8.97	15	48.8	54.4	16.7	30.7	17.3	769	6.5
Rat 59_02	Intermediate	2.05	0.3	0.15	9.18	15.3	54.5	59.4	16.7	28.1	16.2	116	9.3
Rat 59_03	Intermediate	2.14	0.24	0.15	9.39	15.4	54.7	58.3	16.4	28.2	17	121	7.7
Rat 61_01	High	8.45	0.94	0.79	9.3	16.4	50	53.8	17.6	32.8	17	805	6.3
Rat 61_02	High	7.78	0.69	0.87	9.87	16.1	54.7	55.4	16.3	29.4	16.9	705	6.3
Rat 63_02	High	6.28	0.25	0.08	9.02	15.4	48.6	53.9	17.1	31.7	17.8	807	6.5
Rat 63_02	High	9.36	0.28	0.22	9.39	15.8	50.5	53.8	16.8	31.3	17.8	820	6.5
Rat 65_01	High	8.33	0.16	0	9.13	15.7	49.8	54.5	17.2	31.5	17.4	784	6.2
Rat 65_02	High	7.33	0.05	0.12	9.29	15.4	50.5	54.4	16.6	30.5	17.7	818	6.3
Rat 67_01	High	6.84	0.91	0.54	8.85	14.9	46.6	52.6	16.8	32	17	692	6.3
Rat 67_02	High	2.76	1.73	0.97	9.04	14.8	48.8	54	16.4	30.3	17	749	6.1
Rat 7_01	High	5.06	0.37	0	9.32	15.8	50.4	54.1	17	31.3	17	892	6
Rat 7_02	High	3.34	0.61	0	9.25	15.3	50.4	54.5	16.5	30.4	16.8	885	6
Rat 71_01	High	3.18	0.69	0.3	8.91	15	48.7	54.7	16.8	30.8	16.5	769	6.2
Rat 71_02	High	4.61	0.27	0	8.89	15.1	48.9	55	17	30.9	16.8	765	6.3
Rat 31_01	High	1.29	0.01	0	4.55	7.4	25.5	56	16.3	29	15.4	19	11.1
Rat 31_02	High	0.91	0.24	0	5.25	8.6	29.5	56.2	16.4	29.2	16.1	29	10.9
Rat 75_01	High	3	0.15	0	9.33	15.4	50.7	54.3	16.5	30.4	16.5	890	5.8
Rat 75_01	High	5.85	0.06	0	9.64	15.7	52.1	54	16.3	30.1	17.3	881	6.1
Rat 77_01	High	5.11	0	0	9.83	16.4	53	53.9	16.7	30.9	17.4	1042	6.4
Rat 77_02	High	6.1	0	0	9.62	16.4	51.9	53.9	17	31.6	17	1000	6.1
Rat 79_01	High	3.58	0.28	0.18	7.93	14.1	43.9	55.4	17.8	32.1	16.5	57	9.2
Rat 79_02	High	2.44	0.22	0	8.93	14.4	50.3	56.3	16.1	28.6	16	62	10.5

Female Rats											
Animal ID	Group	Date	Time	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %
RAT 2_01	Control	5/18/2016	8:32 AM	3.58	0.66	2.79	0.11	0.02	0	18.5	78.01
RAT 2_02	Control	5/18/2016	8:37 AM	3.64	0.74	2.72	0.17	0	0	20.44	74.79
RAT 4_01	Control	5/18/2016	9:55 AM	5.64	1.11	4.35	0.16	0.02	0	19.61	77.12
RAT 4_02	Control	5/18/2016	9:58 AM	5.56	0.81	4.33	0.42	0	0	14.53	77.86
RAT 6_01	Control	5/18/2016	10:24 AM	5.02	0.91	3.98	0.11	0.01	0.01	18.17	79.35
RAT 6_02	Control	5/18/2016	10:27 AM	4.98	0.85	3.91	0.19	0.02	0	17.11	78.61
RAT 28_01	Control	5/18/2016	10:40 AM	1.78	0.2	1.49	0.09	0	0	11.39	83.77
RAT 28_02	Control	5/18/2016	10:43 AM	1.78	0.17	1.49	0.11	0	0	9.65	83.94
RAT 10_01	Control	5/18/2016	11:30 AM	4.7	0.73	3.78	0.18	0.01	0	15.48	80.53
RAT 10_02	Control	5/18/2016	11:33 AM	5.06	0.81	3.93	0.31	0.01	0	16	77.62
RAT 12_01	Control	5/18/2016	11:47 AM	3.02	0.33	2.5	0.19	0	0	10.88	82.79
RAT 12_02	Control	5/18/2016	11:50 AM	3.1	0.32	2.62	0.15	0	0	10.41	84.61
RAT 14_01	Control	5/18/2016	12:09 PM	6.14	0.79	4.82	0.49	0.03	0.02	12.79	78.5
RAT 14_02	Control	5/18/2016	12:11 PM	6.04	0.94	4.79	0.26	0.03	0.02	15.62	79.27
RAT 16_01	Control	5/18/2016	12:32 PM	5.72	0.34	5.28	0.08	0.02	0	5.98	92.26
RAT 16_02	Control	5/18/2016	12:34 PM	5.84	0.33	5.36	0.13	0.01	0.01	5.61	91.77
RAT 18_01	Control	5/18/2016	12:53 PM	7.06	1.17	5.57	0.29	0.02	0	16.6	78.9
RAT 18_02	Control	5/18/2016	12:56 PM	7	1.04	5.73	0.2	0.01	0.01	14.81	81.9
RAT 20_01	Control	5/18/2016	1:22 PM	7.06	1.02	5.77	0.26	0.01	0.01	14.4	81.69
RAT 20_03	Control	5/18/2016	1:28 PM	6.88	1.05	5.53	0.28	0.01	0.01	15.3	80.37
RAT 22_01	Low	5/18/2016	8:41 AM	8.76	1.77	6.27	0.71	0	0	20.22	71.6
RAT 22_02	Low	5/18/2016	8:43 AM	8.92	1.62	6.8	0.5	0	0	18.21	76.23
RAT 24_01	Low	5/18/2016	10:01 AM	4.82	0.79	3.55	0.46	0	0.02	16.39	73.55
RAT 24_02	Low	5/18/2016	10:04 AM	4.58	0.73	3.58	0.27	0	0	15.95	78.23
RAT 26_01	Low	5/18/2016	10:32 AM	6.3	1.26	4.7	0.31	0.03	0.01	19.97	74.54
RAT 26_03	Low	5/18/2016	10:38 AM	5.92	1.03	4.56	0.31	0	0.02	17.36	76.95
RAT 58_01	Low	5/18/2016	11:04 AM	1.32	0.26	1.02	0.03	0	0	20.04	77.5
RAT 58_02	Low	5/18/2016	11:06 AM	1.4	0.27	1.08	0.05	0	0	19.39	77.01
RAT 30_02	Low	5/18/2016	11:26 AM	5.22	0.92	4.03	0.26	0.01	0	17.72	77.12
RAT 30_03	Low	5/18/2016	11:28 AM	5.2	1	3.89	0.3	0.01	0	19.25	74.83
RAT 32_01	Low	5/18/2016	11:53 AM	4.62	0.57	3.89	0.16	0	0	12.44	84.2
RAT 32_02	Low	5/18/2016	11:56 AM	4.42	0.68	3.65	0.08	0	0	15.47	82.61
RAT 34_01	Low	5/18/2016	12:14 PM	3	0.56	2.29	0.09	0.04	0.02	18.76	76.28
RAT 34_02	Low	5/18/2016	12:19 PM	2.82	0.38	2.24	0.12	0.04	0.04	13.46	79.41
RAT 36_01	Low	5/18/2016	12:38 PM	4.48	0.65	3.76	0.06	0.01	0	14.42	83.86
RAT 36_02	Low	5/18/2016	12:40 PM	4.82	0.65	3.96	0.19	0.01	0.01	13.46	82.19
RAT 68_02	Low	5/18/2016	1:02 PM	2.96	0.45	2.42	0.08	0	0	15.28	81.9
RAT 68_03	Low	5/18/2016	1:06 PM	3.62	0.67	2.84	0.09	0.02	0	18.58	78.41
RAT 40_01	Low	5/18/2016	1:31 PM	2.02	0.29	1.68	0.05	0	0	14.58	83.03
RAT 40_02	Low	5/18/2016	1:33 PM	2.04	0.3	1.71	0.02	0	0	14.88	83.7

Animal ID	Group	MO% %	EO% %	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
RAT 2_01	Control	2.95	0.54	0	8.55	14.9	48.1	56.2	17.4	31	17.1	664	6.5
RAT 2_02	Control	4.65	0.12	0	8.57	14.6	48.3	56.4	17	30.2	15.6	720	6.4
RAT 4_01	Control	2.87	0.41	0	9.58	15.2	54.4	56.8	15.9	27.9	15.8		2.6
RAT 4_02	Control	7.53	0	0.08	9.5	15.2	54.6	57.5	16	27.8	16.1		2.6
RAT 6_01	Control	2.18	0.19	0.1	8.66	14.6	49.6	57.3	16.9	29.4	15	653	5.8
RAT 6_02	Control	3.9	0.39	0	9.01	14.7	51.4	57	16.3	28.6	15.1	632	5.8
RAT 28_01	Control	4.85	0	0	8.59	14.6	49.5	57.6	17	29.5	15.2	23	9.1
RAT 28_02	Control	6.42	0	0	8.8	14.2	50.8	57.7	16.1	28	15.7	19	8.8
RAT 10_01	Control	3.78	0.2	0	8.82	15.1	49.9	56.6	17.1	30.3	15.1	777	6
RAT 10_02	Control	6.2	0.1	0.09	9.62	16	55.3	57.5	16.6	28.9	16.1	858	5.8
RAT 12_01	Control	6.18	0.15	0	9.16	15.3	53.2	58.1	16.7	28.8	15.2	41	9.5
RAT 12_02	Control	4.81	0	0.16	8.85	15.2	51.3	58	17.2	29.6	16	60	10.7
RAT 14_01	Control	7.94	0.49	0.28	9.37	15.9	54.1	57.7	17	29.4	16	919	5.9
RAT 14_02	Control	4.3	0.52	0.29	9.22	15.5	52.9	57.4	16.8	29.3	16.4	866	6.2
RAT 16_01	Control	1.38	0.37	0	8.36	14.6	47.4	56.7	17.5	30.8	15.5	398	6.4
RAT 16_02	Control	2.18	0.19	0.25	8.48	14.7	48.6	57.3	17.3	30.2	15.8	436	6.3
RAT 18_01	Control	4.17	0.26	0.07	8.95	14.6	50.1	56	16.3	29.1	16.5	663	6.1
RAT 18_02	Control	2.86	0.21	0.21	9.02	14.7	51.5	57.1	16.3	28.5	16.5	672	6.2
RAT 20_01	Control	3.67	0.12	0.13	9.43	15.1	54.3	57.6	16	27.8	16.1	477	6.3
RAT 20_03	Control	4.04	0.11	0.16	9.82	15.6	56.3	57.3	15.9	27.7	16.4	752	6.2
RAT 22_01	Low	8.13	0.05	0	9.62	16.1	54.3	56.4	16.7	29.7	16.5	454	6.3
RAT 22_02	Low	5.55	0	0	9.53	16	54.8	57.5	16.8	29.2	16.1	480	6.3
RAT 24_01	Low	9.6	0.06	0.39	8.91	14.6	53.4	59.9	16.4	27.3	14.3	50	9.9
RAT 24_02	Low	5.82	0	0	8.72	14.8	52.5	60.2	17	28.2	14.7	69	9.1
RAT 26_01	Low	4.88	0.46	0.15	9.33	15.7	53.1	56.9	16.8	29.6	15.8	1167	6.1
RAT 26_03	Low	5.22	0.08	0.39	9.12	15.7	52.6	57.7	17.2	29.8	15.7	295	6.3
RAT 58_01	Low	2.46	0	0	9.16	14.7	52.4	57.2	16	28.1	15.9	24	11.1
RAT 58_02	Low	3.59	0	0	8.75	14.9	49.8	56.9	17	29.9	15.4	34	11.1
RAT 30_02	Low	4.9	0.17	0.09	8.85	14.6	51.1	57.7	16.5	28.6	15.8	709	6
RAT 30_03	Low	5.73	0.19	0	8.72	15.2	48.8	56	17.4	31.1	16.1	536	6
RAT 32_01	Low	3.36	0	0	9.51	15.3	54	56.8	16.1	28.3	17.4	91	8.9
RAT 32_02	Low	1.91	0	0	9.45	15.5	53.9	57	16.4	28.8	16.6	96	9.9
RAT 34_01	Low	3	1.27	0.68	9.41	15.5	55.1	58.6	16.5	28.1	16.1	299	6.3
RAT 34_02	Low	4.28	1.28	1.55	9.57	16.3	56.3	58.8	17	29	16.5	311	6.2
RAT 36_01	Low	1.3	0.3	0.11	8.71	13.8	50.4	57.9	15.8	27.4	16	60	8.6
RAT 36_02	Low	3.87	0.3	0.2	8.82	14.5	51.3	58.2	16.4	28.3	15.4	40	9.6
RAT 68_02	Low	2.67	0.15	0	7.19	11.5	41.1	57.1	16	28	16.1	63	10.2
RAT 68_03	Low	2.58	0.43	0	8.64	13.6	49.3	57.1	15.7	27.6	16.5	78	9.5
RAT 40_01	Low	2.39	0	0	8.51	13.6	48	56.4	16	28.3	15.8	119	7.9
RAT 40_02	Low	1.22	0.21	0	8.74	14.1	50.2	57.4	16.1	28.1	16.1	117	7.8



Animal ID	Group	Date	Time	WBC K/uL	NE# K/uL	LY# K/uL	MO# K/uL	EO# K/uL	BA# K/uL	NE% %	LY% %
RAT 42_01	Intermediate	5/18/2016	8:48 AM	4.4	0.84	3.31	0.22	0.01	0.02	19.2	75.22
RAT 42_02	Intermediate	5/18/2016	8:51 AM	3.96	0.72	3.01	0.2	0.02	0	18.3	76.02
RAT 44_01	Intermediate	5/18/2016	10:09 AM	4.12	0.71	3.03	0.37	0	0	17.25	73.51
RAT 44_02	Intermediate	5/18/2016	10:11 AM	3.96	0.64	2.88	0.42	0.01	0.02	16.04	72.7
RAT 46_01	Intermediate	5/18/2016	10:48 AM	4.82	0.91	3.7	0.15	0.04	0.02	18.98	76.86
RAT 46_02	Intermediate	5/18/2016	10:51 AM	4.94	0.82	3.67	0.32	0.08	0.05	16.68	74.38
RAT 48_01	Intermediate	5/18/2016	11:09 AM	3.42	0.55	2.66	0.21	0	0	15.96	77.92
RAT 48_02	Intermediate	5/18/2016	11:12 AM	3.42	0.55	2.75	0.13	0	0	15.95	80.32
RAT 50_01	Intermediate	5/18/2016	11:36 AM	3.52	0.68	2.65	0.18	0.01	0	19.38	75.23
RAT 50_02	Intermediate	5/18/2016	11:39 AM	3.46	0.75	2.59	0.12	0.01	0	21.61	74.72
RAT 52_01	Intermediate	5/18/2016	11:59 AM	4.36	0.84	3.33	0.2	0	0	19.25	76.27
RAT 52_02	Intermediate	5/18/2016	12:01 PM	4.16	0.76	3.29	0.1	0	0	18.28	79.2
RAT 54_02	Intermediate	5/18/2016	12:22 PM	3.46	0.74	2.48	0.24	0	0	21.53	71.58
RAT 56_01	Intermediate	5/18/2016	12:24 PM	3.58	0.9	2.32	0.35	0.01	0	25.15	64.87
RAT 56_01	Intermediate	5/18/2016	12:43 PM	3.72	0.7	2.9	0.12	0	0	18.74	77.83
RAT 56_02	Intermediate	5/18/2016	12:46 PM	3.8	0.62	3.01	0.16	0.01	0	16.34	79.19
RAT 8_01	Intermediate	5/18/2016	1:11 PM	3.32	0.68	2.53	0.09	0.01	0.02	20.46	76.07
RAT 8_02	Intermediate	5/18/2016	1:13 PM	3.24	0.49	2.66	0.08	0	0	15.12	82.23
RAT 60_01	Intermediate	5/18/2016	1:36 PM	2.58	0.3	2.22	0.05	0	0	11.52	86.23
RAT 60_02	Intermediate	5/18/2016	1:39 PM	2.46	0.32	2.1	0.04	0	0	12.98	85.32
RAT 62_04	High	5/18/2016	9:48 AM	2.9	0.52	2.27	0.1	0.01	0	17.94	78.37
RAT 62_05	High	5/18/2016	9:51 AM	2.94	0.56	2.16	0.21	0.01	0	18.92	73.51
RAT 64_01	High	5/18/2016	10:17 AM	3.96	0.72	3.12	0.11	0	0.01	18.14	78.91
RAT 64_02	High	5/18/2016	10:20 AM	4.12	0.8	3.01	0.32	0	0	19.37	72.98
RAT 66_02	High	5/18/2016	10:57 AM	6.42	1.18	4.86	0.32	0.05	0	18.42	75.67
RAT 66_03	High	5/18/2016	11:00 AM	6.46	1.26	4.88	0.3	0.01	0	19.55	75.55
RAT 38_02	High	5/18/2016	11:18 AM	6.36	1.69	4.33	0.3	0.02	0.02	26.52	68.05
RAT 38_03	High	5/18/2016	11:21 AM	6.2	1.65	4.13	0.4	0.02	0	26.6	66.58
RAT 70_01	High	5/18/2016	11:42 AM	6.78	1.46	5.04	0.25	0.01	0.02	21.54	74.33
RAT 70_02	High	5/18/2016	11:45 AM	7.14	1.64	5.21	0.2	0.05	0.04	23	72.96
RAT 72_01	High	5/18/2016	12:04 PM	5.58	0.8	4.59	0.19	0	0	14.32	82.19
RAT 72_02	High	5/18/2016	12:07 PM	5.6	0.87	4.45	0.27	0	0	15.62	79.51
RAT 74_01	High	5/18/2016	12:26 PM	6.24	1.18	4.9	0.16	0	0	18.93	78.52
RAT 74_02	High	5/18/2016	12:29 PM	6.14	1.08	4.88	0.17	0	0	17.64	79.52
RAT 76_01	High	5/18/2016	12:48 PM	5.02	0.95	3.88	0.16	0.01	0.01	19	77.32
RAT 76_02	High	5/18/2016	12:50 PM	4.98	1	3.79	0.14	0.03	0.01	20.06	76.2
RAT 78_01	High	5/18/2016	1:16 PM	6.92	1.34	5.3	0.25	0.01	0.01	19.38	76.63
RAT 78_02	High	5/18/2016	1:19 PM	6.68	1.23	5.16	0.27	0	0.01	18.39	77.32
RAT 80_01	High	5/18/2016	1:42 PM	2.92	0.72	2.18	0	0	0.01	24.6	74.77
RAT 80_02	High	5/18/2016	1:44 PM	2.82	0.58	2.2	0.03	0.01	0	20.42	78.1

Animal ID	Group	MO% %	EO% %	BA% %	RBC M/uL	HB g/dL	HCT %	MCV fL	MCH Pg	MCHC g/dL	RDW %	PLT K/uL	MPV fL
RAT 42_01	Intermediate	4.89	0.23	0.46	8.57	14.5	47.8	55.8	16.9	30.3	16.1	484	6.8
RAT 42_02	Intermediate	5.16	0.52	0	8.82	14.7	49.1	55.7	16.7	29.9	16.2	232	7
RAT 44_01	Intermediate	9.02	0.11	0.11	8.88	15	52.7	59.4	16.9	28.5	14.5	643	5.9
RAT 44_02	Intermediate	10.54	0.24	0.48	8.9	14.2	52.4	58.9	16	27.1	14.9	635	5.9
RAT 46_01	Intermediate	3.04	0.78	0.35	9.34	15.1	52.7	56.4	16.2	28.7	16	1087	5.9
RAT 46_02	Intermediate	6.48	1.56	0.92	9.54	15.7	54.2	56.8	16.5	29	15.4	732	6.1
RAT 48_01	Intermediate	6.04	0	0.07	8.97	15.5	50.4	56.2	17.3	30.8	16.4	692	5.9
RAT 48_02	Intermediate	3.72	0	0	9.12	15.8	51.3	56.2	17.3	30.8	16.5	673	5.8
RAT 50_01	Intermediate	5.11	0.27	0	9.62	15.8	54.8	57	16.4	28.8	16.1	480	6
RAT 50_02	Intermediate	3.42	0.25	0	9.79	16	56.3	57.5	16.3	28.4	16.1	360	6.2
RAT 52_01	Intermediate	4.48	0	0	9.43	14.9	52.3	55.5	15.8	28.5	16.5	831	6
RAT 52_02	Intermediate	2.42	0	0.11	8.85	14.3	49.6	56	16.2	28.8	16.1	766	6
RAT 54_02	Intermediate	6.88	0	0	8.72	14.6	50.8	58.3	16.7	28.7	15.4	754	6.1
RAT 56_01	Intermediate	9.73	0.25	0	8.82	14.1	51.5	58.4	16	27.4	15.4	747	6.4
RAT 56_01	Intermediate	3.3	0.13	0	9.59	15.4	54	56.3	16.1	28.5	16.7	939	6.2
RAT 56_02	Intermediate	4.24	0.22	0	9.1	15	51.3	56.4	16.5	29.2	15.4	912	5.9
RAT 8_01	Intermediate	2.65	0.28	0.55	8.26	12.8	45.9	55.6	15.5	27.9	16.2	783	6.1
RAT 8_02	Intermediate	2.52	0.13	0	8.54	14.5	49	57.4	17	29.6	16.1	717	6.3
RAT 60_01	Intermediate	2.08	0.17	0	8.69	14.4	50.7	58.4	16.6	28.4	15.7	58	9.4
RAT 60_02	Intermediate	1.69	0	0	8.79	14.5	51.3	58.4	16.5	28.3	15.4	62	9.3
RAT 62_04	High	3.36	0.33	0	9.91	16.1	56.1	56.6	16.2	28.7	16.5		2.4
RAT 62_05	High	7.01	0.39	0.16	10.14	16.5	57.5	56.7	16.3	28.7	17		2.4
RAT 64_01	High	2.7	0.1	0.14	9.91	16	57.3	57.8	16.1	27.9	15.2	481	6.3
RAT 64_02	High	7.65	0	0	10.05	17.2	58	57.7	17.1	29.7	15.1	480	6.2
RAT 66_02	High	4.99	0.85	0.07	8.95	14.7	50.5	56.4	16.4	29.1	16.2	465	5.8
RAT 66_03	High	4.65	0.17	0.07	9.03	15	50.5	55.9	16.6	29.7	15.4	528	5.7
RAT 38_02	High	4.75	0.3	0.38	8.84	15.3	50.1	56.7	17.3	30.5	15.5	664	5.6
RAT 38_03	High	6.4	0.35	0.07	9.08	15.1	52	57.3	16.6	29	16.5	517	6
RAT 70_01	High	3.69	0.17	0.28	8.73	14.3	50.2	57.5	16.4	28.5	16.1	634	6.2
RAT 70_02	High	2.8	0.65	0.59	8.98	14.9	51.1	56.9	16.6	29.2	15.4	601	5.8
RAT 72_01	High	3.48	0.01	0	9.19	15.3	51.9	56.5	16.6	29.5	16.7	50	11.1
RAT 72_02	High	4.88	0	0	9.23	15.4	51.5	55.8	16.7	29.9	16.8	52	9.6
RAT 74_01	High	2.55	0	0	9.55	16.1	54.6	57.2	16.9	29.5	16.1	89	8.2
RAT 74_02	High	2.76	0.07	0	9.59	15.5	54.4	56.7	16.2	28.5	16.2	84	8.4
RAT 76_01	High	3.2	0.2	0.29	8.79	14.6	49.9	56.8	16.6	29.3	16.5	662	6.3
RAT 76_02	High	2.86	0.58	0.3	9.1	15	52.2	57.4	16.5	28.7	16.5	690	6.2
RAT 78_01	High	3.6	0.19	0.2	8.99	14.3	50.6	56.3	15.9	28.3	16.1	718	6
RAT 78_02	High	4	0.06	0.22	8.62	15.1	48.5	56.3	17.5	31.1	16.4	605	6.1
RAT 80_01	High	0.14	0.16	0.33	9.78	16.3	55.9	57.2	16.7	29.2	15.9	119	9.5
RAT 80_02	High	1.15	0.33	0	9.66	15.3	54.9	56.8	15.8	27.9	15.9	102	8.8

## APPENDIX N. REPEATED EXPOSURE STUDY HISTOPATHOLOGY GRADES

### Appendix Key

<b>Severity Ratings</b>	
0	Normal Tissue
1	Minimal/Rare
2	Mild
3	Moderate
4	Marked
5	Severe
<b>Description Key</b>	
BT	basophilic tubules
ED	edema
EL	epithelial loss
ENT	essentially normal tissue
F	focal
HM	hemorrhage
IM	inflammation (mononuclear)
IN	inflammation (neutrophilic)
MF	multifocal
MFE	multifocal, extensive
ND	necrotic debris
NP	not processed
SCN	single cell necrosis
<b>Abbreviations</b>	
SD	standard deviation
SEM	standard error of the mean

Control Group											
Animal											
Accession #	ID	NL1	Description	NL2	Description	NL3	Description	NL4	Description	Lungs	Description
160035	1	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160036	2	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160037	3	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160038	4	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160039	5	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160040	6	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160041	69	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160042	28	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160043	9	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160044	10	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160045	11	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160046	12	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160047	13	-	NP	-	NP	0	ENT	0	ENT	0	ENT
160048	14	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160049	15	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160050	16	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160051	17	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160052	18	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160053	19	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160054	20	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
Mean		0		0		0		0		0	

Animal		Fore & Mid Brain,						Adrenal Glands,		Missing
ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid Gland		Tissues
1	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
2	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
3	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
4	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
5	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
6	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT		-
69	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
28	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
9	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
10	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
11	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
12	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
13	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
14	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
15	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
16	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
17	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
18	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
19	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
20	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		-

20 mg/m3 Exposure Group											
Animal											
Accession #	ID	NL1 Description	NL2 Description	NL3 Description	NL4 Description	Lungs	Description				
160055	21	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160056	22	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160057	23	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160058	24	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160059	25	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160060	26	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160061	27	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160062	58	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160063	29	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160064	30	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160065	73	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160066	32	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160067	33	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160068	34	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160069	35	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160070	36	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160071	37	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160072	68	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160073	39	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160074	40	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
Mean		0		0		0		0		0	

Animal		Fore & Mid Brain,						Adrenal Glands,		Missing
ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid Gland		Tissues
21	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
22	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		-
23	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
24	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
25	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
26	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
27	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
58	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
29	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
30	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
73	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
32	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
33	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
34	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		-
35	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
36	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT		-
37	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
68	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT		thyroid
39	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-
40	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT		-

100 mg/m3 Exposure Group											
Animal											
Accession #	ID	NL1	Description	NL2	Description	NL3	Description	NL4	Description	Lungs	Description
160075	41	0	ENT	0	ENT	0	ENT	0	ENT	1*	HM/F
160076	42	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160077	43	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160078	44	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160079	45	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160080	46	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160081	47	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160082	48	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160083	49	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160084	50	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160085	51	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160086	52	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160087	53	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160088	54	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160089	55	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160090	56	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160091	57	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160092	8	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160093	59	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160094	60	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
Mean		0		0		0		0		0	
*Multifocal hemorrhage due to euthanasia and not test compound administration; Severity score not included in mean											
as occurrence is unrelated to compound.											

Animal									
Fore & Mid Brain,			Adrenal Glands,					Missing	
ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid Gland	Tissues
41	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
42	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	-
43	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
44	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	-
45	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
46	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
47	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
48	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
49	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
50	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
51	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
52	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
53	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
54	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
55	NP	NP	ENT	ENT	ENT	ENT	ENT	ENT	-
56	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
57	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	spleen
8	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
59	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
60	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid

300 mg/m3 Exposure Group											
Animal											
Accession #	ID	NL1	Description	NL2	Description	NL3	Description	NL4	Description	Lungs	Description
160095	61	0	ENT	0	ENT	0	ENT	0	ENT	1	IN/IM/MF
160096	62	0	ENT	0	ENT	0	ENT	1	ND/IN/MF	1	IN/IM/MF
160097	63	0	ENT	0	ENT	0	ENT	0	ENT	1	IN/IM/MF
160098	64	0	ENT	0	ENT	0	ENT	0	ENT	2	IN/IM/MF
160099	65	0	ENT	0	ENT	0	ENT	1	ND/MF	1	IN/IM/MF
160100	66	0	ENT	0	ENT	0	ENT	1	ND/IN/EL/MF	2	IN/IM/MF
160101	67	0	ENT	0	ENT	0	ENT	1	EL/MF	1	IN/IM/MF
160102	38	0	ENT	0	ENT	0	ENT	1	ND/EL/IN/MF	1	IN/IM/MF
160103	7	0	ENT	0	ENT	0	ENT	1	ND/EL/IN/MF	1	IN/IM/MF
160104	70	0	ENT	0	ENT	0	ENT	1	ND/EL/IN/MF	2	IN/IM/MF
160105	71	0	ENT	0	ENT	0	ENT	1	SCN/IN/MF	2	IN/IM/MF
160106	72	0	ENT	0	ENT	0	ENT	0	ENT	2	IN/IM/ND/SCD/MFE
160107	31	0	ENT	0	ENT	0	ENT	0	ENT	1	IN/IM/MF
160108	74	0	ENT	0	ENT	0	ENT	1	ND/EL/IN/MF	2	IN/IM/ND/SCD/MFE
160109	75	0	ENT	0	ENT	0	ENT	1	IN/MF	1	IN/MF
160110	76	0	ENT	0	ENT	0	ENT	0	ENT	1	IN/IM/MF
160111	77	0	ENT	0	ENT	0	ENT	2	ED/EL/MF	1	IN/IM/MF
160112	78	0	ENT	0	ENT	0	ENT	0	ENT	1	IN/IM/MF
160113	79	0	ENT	0	ENT	0	ENT	0	ENT	0	ENT
160114	80	0	ENT	0	ENT	0	ENT	1	EL/IN/MF	1	IN/IM/MF
Mean		0		0		0		0.65		1.25	
SD								0.59		0.55	
SEM								0.13		0.12	
Lesions								12		19	
N								20		20	
Incidence, %								60		95	

Animal									
		Fore & Mid Brain,				Adrenal Glands,			Missing
ID	Larynx	Trachea	Cerebellum	Heart	Esophagus	Liver	Kidneys	Spleen, Thyroid Gland	Tissues
61	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
62	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
63	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
64	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
65	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
66	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
67	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
38	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
7	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
70	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
71	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
72	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
31	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
74	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
75	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
76	ENT	ENT	ENT	ENT	ENT	ENT	BT/F/1	ENT	thyroid
77	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
78	ENT	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-
79	ENT	NP	ENT	ENT	ENT	ENT	ENT	ENT	thyroid
80	NP	ENT	ENT	ENT	ENT	ENT	ENT	ENT	-

## LIST OF ACRONYMS

AAALAC	Association for Assessment and Accreditation of Laboratory Animal Care
AEGL	Acute Exposure Guideline Level
AFB	Air Force Base
ANOVA	analysis of variance
AST	aspartate aminotransferase
AVMA	American Veterinary Medical Association
CAS	Chemical Abstract Service
cSt	centistokes
DTIC	Defense Technical Information Center
EPA	Environmental Protection Agency
FOB	functional observational battery
GLP	Good Laboratory Practices
GSD	geometric standard deviation
HEPA	high efficiency particulate air
HJF	Henry M. Jackson Foundation for the Advancement of Military Medicine
IACUC	Installation Animal Care and Use Committee
MMAD	mass median aerodynamic diameter
MPPD	Multi-Path Particle Dosimetry
NAMRU-D	Naval Medical Research Unit – Dayton
NL	nasal level
NOAEC	no observable adverse effect concentration
NRC	National Research Council
OBOGS	on board oxygen generator system
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
OpEL	operational exposure limit
ORISE	Oak Ridge Institute for Science and Education
PAO	polyalphaolefin
PAS	photobeam activity system
POD	point of departure
RAM	real-time aerosol monitor
SD	standard deviation
UF	uncertainty factor
USAF	U.S. Air Force